RESEARCH in EDUCATION

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JOHN W. BEST
Professor of Education
Butler University

RESEARCH IN EDUCATION

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PREFACE

THIS BOOK HAS BEEN WRITTEN PRIMARILY FOR THE graduate student in Education, but may be useful to educational workers who are interested in professional problem-solving or research in the field.

While writing a thesis is no longer a prerequisite for the Master's degree in Education in most institutions, graduate students are expected to present simple studies and term papers in connection with graduate courses. Graduate teacher-students can profitably carry on modest research projects that help in finding solutions to the countless problems confronting classroom teachers and school administrators.

All graduate students should be familiar with scholarly research in Education; and, if only as consumers, it is important that they understand the terminology, the methodology, and the spirit of systematic research, and be able to evaluate the published research reports that are found in professional publications.

The author is aware of the pitfalls inherent in writing a book on educational research. On the one hand is the tendency to heaviness or dullness that has often characterized scholarly work in this area. Since research is a tremendously complex field of activity, there is a temptation to attempt a *complete* treatment, often too complex to be of maximum value to beginning students in the graduate program in Education.

On the other hand, in trying to make clear an area of activity that is complex, there is the equal danger of presenting a superficial picture, with not enough actual aid in how to carry on research projects. No matter what one presents, there is likely to be some degree of oversimplification. No textbook can present all of the information that would be helpful.

The author has tried to present the theory and application of Educational Research in as clear and concise a manner as possible. But no treatment can or should be completely exhaustive, and the instructor may want to amplify, illuminate, and supplement certain areas of this treatment.

Any book is the product of the contributions of a number of people. The author is indebted to many individuals, more than can be acknowledged by name. He is especially indebted to Professor A. S. Barr of the University of Wisconsin for many of the basic ideas. Gratitude is also due Dean J. Hartt Walsh, Butler University College of Education, for his suggestions and encouragement, his colleagues for their helpful advice, the many graduate students whose reactions to the presentation of these ideas proved most helpful, and Butler University for making the project possible.

To his wife, Solveig, the author expresses gratitude for her constant encouragement and forbearance.

J.W.B.

Indianapolis, Indiana

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RESEARCH IN EDUCATION

1

THE MEANING OF RESEARCH

FROM THE BEGINNING OF TIME MAN HAS BEEN CURIous about the world around him. His earliest efforts to explain the operation of the universe resulted in primitive religious concepts, attributing the mysterious forces of nature to the working of supernatural powers who, at their whims, manipulated the sun, the stars, the wind, and the rain.

The appearance of the medicine man or the priest who claimed special channels of communication with the gods led to the establishment of a rigid system of authority. Explanations of physcial phenomena and life's processes were made in terms of mysticism and the dogma of the priesthood.

But, gradually, man began to see that the operations of the forces of nature were not as capricious as he had believed. He began to observe a certain orderliness in the universe, certain cause-effect relationships, and discovered that under certain conditions, events could be predicted with reasonable accuracy.

But these explanations were rejected if they seemed to conflict with the dogma of religious authority. Curious men were punished if they persisted in expressing the doubts raised by these dangerous and unorthodox beliefs.

This reliance on empirical evidence or personal experience challenged the sanction of vested authority, and represented a step in the direction of scientific inquiry. It was largely unsystematic observation, however, subject to the limitations of the individual's experience and his lack of an objective method. He was likely to overgeneralize on the basis of incomplete evidence or experience, to ignore complex factors in a situation, or to let his feelings and prejudices condition both his observations and his conclusions. It was only when man began to think systematically about thinking itself that the era of science really began.

The first systematic approach to reasoning was through the use of the syllogism, attributed to Aristotle and the Greeks. Syllogistic reasoning established a logical relationship between a major premise, a minor premise, and a conclusion. A major premise is a self-evident assumption, previously established by metaphysical truth or dogma, concerning a relationship; the minor premise is a particular case concerning one of the parts of this relationship; given the truth of these premises, they lead to an inescapable conclusion.

A typical example follows:

Major Premise—Man is a rational being.
Minor Premise—Edward Jones is a man
Conclusion—Edward Jones is a rational being.

This *deductive* method of logical analysis made an important contribution to the development of the scientific method.

Centuries later, Francis Bacon advocated the application of direct observation of phenomena, arriving at generalizations or truths from the marshalled evidence of many specific observations. This *inductive* process of moving from the specific or particular to the general freed logic from some of the hazards and limitations of deductive thinking alone. Bacon recognized the obstacle that the deductive process placed in the way of discovering new truths in that it started with old dogmas of philosophy and religion that the human mind had already accepted. These idols, as he termed them, were exposed in his *Novum Organum,* written in 1620. He proposed a new method of advancing human knowledge, the inductive process, which formed many direct observations of the phenomena of the external world into new generalizations. This method, new to the field of logic but already widely used by scientists, was not hampered by false premises, the inadequacies of verbal symbolism, and the absence of supporting evidence.

But the inductive method alone did not provide a complete system for the solution of problems. Random collection of individual observations without any unifying concept or goal left investigations in a forest of confusion, rarely leading to a logical generalization or principle.

It was Charles Darwin who eventually integrated the deductive method of Aristotle with the inductive method of Francis Bacon. After many years of collecting data on the variation of plants and animals, he arrived at an assumption that natural selection explained the origin of species. This theory was supported by his later observations. Thus, he was able to verify his generalization by the deductive-inductive process, now recognized as the essence of the scientific method.

The scientist starts with an hypothesis or assumption as a guide to what type of data to gather. The hypothesis is proven, modified, or destroyed in the light of the data. While the scientific method of analysis does not always follow the same simple sequence of steps, a pattern is helpful in identifying the elements that comprise the deductive-inductive process.

1. Identification and definition of the problem.
2. Formulation of an hypothesis—a hunch, an assumption, or an intelligent guess.
3. Collection, organization, and analysis of data.
4. Formulation of conclusions.
5. Verification or rejection of the hypothesis.

At times, the formulation of the hypothesis may not be completed until some data are collected and examined. The scientific investigator may move back and forth between these steps in the process of his analysis of the problem.

THE SOCIAL SCIENCES

The term *science* has come to mean a method or attitude rather than a field of subject matter. By attempting to apply the rigorous controls of systematic observation and analysis of the physical sciences to areas of social behavior, the social sciences have developed. The fields of anthropology, economics, education, government, psychology, sociology, and social psychology have become recognized as social sciences, at least in the thinking of many authorities. To the extent that these areas of study derive their foundations from the methodology and spirit of science, they are sciences—social sciences. There are those who reject this concept, still defining science in terms of areas of subject matter, rather than methodology. Historically, this can be readily explained. Since the scientific method was first used in the investigation of physical phenomena, tradition has identified *science* with the physical world. Only in relatively recent years has the methodology of science been applied to human behavior. Since these are newer areas of investigation, their results have not achieved the acceptance and status that comes with maturity and tradition.

Human behavior is complex. Since individuals differ so much in feelings, drives, and motivations, it is difficult to arrive at generalizations with the certainty that is possible in describing aspects of inanimate objects.

Although the problems of discovering principles of human behavior are difficult, they are not impossible. Social scientists will need to carry on observations as careful and laborious as those that have characterized centuries of effort in the physical sciences. Subjective, qualitative judgments must be supplemented by more exact, quantitative measurements. Progress is being made, and there is little doubt that, in time, we will be able to describe the cause-effect relationships of human behavior in much more exact terms, perhaps approaching the exactness that characterizes the physical sciences.

Today, we live in a world that attests to the miracles of physical science. Many diseases have been conquered. The Salk vaccine promises to rid the world of poliomyelitis. Man's life-span has been increased markedly, actually by almost two-thirds in the past century. Man travels faster than the speed of sound, enjoys a more adequate diet, performs less physical labor, and suffers less from the discomforts of excessive heat, cold, and humidity. He has constant entertainment available at the click of a switch, and enjoys more leisure time than he could have dreamed of a century ago. The splitting of the atom and the developments in the field of electronics promise improvements that are beyond the scope of human imagination. All of these improvements have resulted from the contributions of physical science.

But there is less confidence about the improvement of the nonphysical aspects of our culture. With all of his marvelous gadgets, there is some question about whether man is happier, more satisfied, or that his basic needs are more effectively being fulfilled today than a century ago. The consequences of hot and cold wars and intergroup conflicts have become even more frightening with the development of more effective means of destruction.

It is in the area of the nonmaterial, behavioral aspects of our culture that the scientific method must be employed. This lag of the behavioral sciences in relation to the physical sciences presents the most challenging task that confronts twentieth-century man. These solutions can only be achieved by application of the scientific method to the behavioral areas through research.

WHAT IS RESEARCH?

How is research related to the scientific method? The terms *research* and *scientific method* are often used synonymously in educational discussions. Although it is true that the terms have some common elements of meaning, a distinction would be helpful.

For the purposes of this discussion, research is considered to be the more formal, systematic, intensive process of carrying on the scientific method of analysis. It involves a more systematic structure of investigation, usually resulting in some sort of formal record of procedures and a report of results or conclusions. While it is possible to employ the scientific spirit without research, it would be impossible to engage in sound research without employing the scientific method and spirit.

Thus, research is a more specialized phase of scientific methodology. Many people have a superficial concept of research, picturing the researcher as a strange, introverted individual who, shunning the company of his fellows, finds refuge in the intricacies of his laboratory. Here, surrounded by test tubes, retorts, beakers, and dials, the scientist carries on his mysterious activities.

In reality, the picture is quite different. Research is not at all mysterious, and is carried on by hundreds of thousands of normal individuals, more often by teams than alone, very often in the factory, school, or community as well as in the laboratory. Its importance is attested by the tremendous amount of time, manpower, and sums of money spent on research by industry, universities, government, and the professions. The "secret" of our cultural development has been research, pushing back the areas of ignorance by discovering new truths which, in turn, lead to better ways of doing things and new and better products.

We recognize the fruits of research: better products, better foods, better ways of preventing and treating diseases, better ways of understanding the behavior of individuals and groups, and a better understanding of the world in which we live. In the field of education, we identify research with a better understanding of the teaching-learning process, and the conditions under which it is most successfully carried on.

CHARACTERISTICS OF RESEARCH

A summary of some of the characteristics of research may clarify the concept of its methodology.

Research gathers new knowledge or data from primary or first-hand sources. It is not research when one merely restates or reorganizes what is already known or what has been written. Research places emphasis upon the discovery of general principles. It goes beyond the specific groups and situations investigated, and, by careful sampling procedures, infers qualities of the entire population from those observed in the smaller group.

Research is expert, systematic, and accurate investigation. The researcher knows what is already known about his problem. He proceeds from this point, carefully planning his procedures. Data are gathered, recorded, and analyzed with as complete accuracy as possible. He uses such valid data-gathering instruments as he can find or devise, and employs mechanical means to improve on the accuracy of human observation, recording, and computation of data.

Research is logical and objective, applying every possible test to verify the data collected and the procedures employed. The researcher constantly strives to eliminate personal feeling and preference. He resists the temptation to seek only the data that support his hypothesis. There is no attempt to persuade or to prove. The emphasis is on testing, rather than on proving, the hypothesis. The researcher elevates clear thinking and logic. He suppresses feeling and emotion in his analysis.

Research endeavors to organize data in quantitative terms, if possible, and to express them as numerical measures. Research is patient and unhurried. The researcher is willing to exert painstaking effort, suspending judgment to permit the data and logic to lead to a sound conclusion. He realizes that significant findings do not come as a result of hurried and careless procedures. Research requires courage. The researcher is willing to follow his procedures to conclusions that may be unpopular and bring social disapproval. It would seem appropriate to mention several historic examples of the penalties that come from conflict with dogmas or commonly accepted values.

The Polish scientist, Copernicus, was condemned by church authorities because he announced his conclusion concerning the nature of the universe. His theory that the sun, not the earth, was the center of the solar system, in direct conflict with the older Ptolemaic theory, offended supporters of prevailing religious dogma, who viewed his theory as a denial of the story of creation as portrayed in the book of Genesis.

The late Dr. Albert Kinsey, of Indiana University, who studied the sexual behavior of the American male and the American female, saw his work arouse violent criticism from those whose personal experiences or observations were in conflict with the evidence, or who felt that his area of investigation and methodology inappropriate or in poor taste.

Research is carefully recorded and reported. Every term is carefully defined, all procedures are described in detail, all limiting factors are recognized, all references are carefully documented, and all results are objectively recorded. All conclusions and generalizations are cautiously arrived at, with due consideration for all of the limitations of methodology, data collected, and errors of human interpretation.

The rigorous standards of scientific research are apparent from an examination of these characteristics. The research worker must be a scholarly, imaginative person of the highest integrity, willing to spend long hours painstakingly seeking the truth.

FUNDAMENTAL RESEARCH AND ACTION RESEARCH

The discussion to this point has described research in its more formal aspects. It has drawn its pattern and spirit from the physical sciences, and has represented a rigorous, structured type of analysis. The purpose of this kind of research has been to develop theories by discovering broad generalizations or principles. It has employed careful sampling procedures in order to extend the findings beyond the group or situation studied. It has had little concern for the application of the findings, an area which has been considered to be the concern of someone other than the investigator. Some have termed this methodology the approach of pure research. A more common designation is fundamental research.

During the past twenty to twenty-five years there has been a growing emphasis in social psychology and education on what is known as applied or action research. In education this newer approach has had as its goal the involvement of both research specialist and classroom teacher in the study and application of research to educational problems in the community, school, or classroom, in a particular setting. Advocates of action research have pointed out that fundamental research has never interested more than a small proportion of teachers, and then only as casual consumers or spectators, rather than as active participants. This group has declared fundamental research to be appropriate only when dealing with such problems as the learning processes of white rats in the psychological laboratory. But what of its practicability in studying and trying to improve the complex learning process of a group of students in a classroom? They have charged fundamental research with a failure to make a significant contribution to "grass-roots" education, for, with all of its scientific methodology, teachers have not been able to recognize its application to their everyday classroom problems.

Stephen M. Corey, a leader in the field of action research, states the case in this way: [1]

> . . . I have lost much of the faith I once had in the consequences of asking only the professional educational investigator to study the schools and to recommend what they should do. Incorporating these recommendations into the behavior pattern of practitioners involves some prob-

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[1] Stephen M. Corey, *Action Research to Improve School Practices.* (New York: Bureau of Publications, Teachers College, Columbia University, 1953), p. vii. Used with permission of the publisher.

lems that so far have been insoluable . . . Most of the study of what should be kept in the schools and what should go and what should be added must be done in hundreds of thousands of classrooms and thousands of American communities. The studies must be undertaken by those who may have to change the way they do things as a result of the studies. Our schools cannot keep up with the life they are supposed to sustain and improve unless teachers, pupils, supervisors, administrators, and school patrons continuously examine what they are doing. Singly and in groups, they must use their imaginations creatively and constructively to identify the practices that must be changed to meet the needs and demands of modern life, courageously try out those practices that give better promise, and methodically and systematically gather evidence to test their worth.

This is the process I call action research. I hold no special brief for the name but it has some currency and is sufficiently descriptive. What I will talk about is research that is undertaken by educational practitioners because they believe that by so doing they can make better decisions and engage in better actions.

Action research is focused on the immediate application, not on the development, of theory. It has placed its emphasis on a real problem—here and now in a local setting. Its findings are to be evaluated in terms of local applicability, not in terms of universal validity. Its advocates propose that research be the function of groups of teachers, with research specialists serving either as consultants or as members of the research team. This method provides sufficient flexibility to permit modification of the hypotheses and procedures as the study goes on. Its purpose is to improve school practices and, at the same time, to improve those who are to improve the practices. The purpose is to combine the research function with teacher growth in such qualities as objectivity, skill in research processes, habits of thinking, ability to work harmoniously with others, and professional spirit.

Is there a conflict between fundamental research and action research? Actually, there is none. The difference is in emphasis, not in method or spirit. Each type is committed to the high standards of scientific objectivity and scholarship. The graduate student should understand and appreciate fundamental research as part of his professional training, and should understand that sound educational theory is built on fundamental research. No vocation can be a profession unless its great body of knowledge is based upon sound theory which, in turn, comes from fundamental research. Teachers should be familiar with the findings of fundamental research, particularly in their areas of specialization. Without this understanding they are merely mechanics or craftsmen, and have no right to be considered professional practitioners.

It is not likely, however, that many public school teachers will engage in the more formal aspects of research activity. While fundamental research will continue to make its essential contribution to professional education, it will be largely the function of doctoral candidates and subsidized research specialists in universities, private and government social agencies, professional associations, foundations, and the larger school systems.

If classroom teachers are to make an active research contribution, it will probably be in the area of action research. Studies will be made for the purpose of improving local school practices. Many educational observers see in action research one of the most promising avenues for teacher growth, professional improvement, and the development of a better curriculum.

TYPES OF EDUCATIONAL RESEARCH

Any attempt to classify types of educational research poses a difficult problem. The fact that practically every textbook presents a different system of classification provides convincing evidence that there is no generally accepted scheme.

To systematize a method of presentation, however, some pattern is necessary. At the risk of seeming arbitrary, a framework is suggested that might simplify understanding of basic principles of research methodology. It should be remembered that the system of classification is not important in itself, but only has value in making the analysis of research processes more comprehensible.

Actually, all research involves observation and description, the description of what happens under certain circumstances. A rather simple three-point analysis may be used to classify educational research. Practically all studies fall under one or a combination of these types.

1. *Historical Research* describes *what was*. The process involves investigating, recording, analyzing, and interpreting the events of the past for the purpose of discovering generalizations that are helpful in understanding the present and in predicting the future. The focus of historical research is on change, growth, or development of individuals, groups, practices, movements, institutions, or ideas. Historical research attempts to go back to primary, original, or first-hand sources of information.

2. *Descriptive research* describes *what is*. It involves the description, recording, analysis, and interpretation of the present nature, composition, or processes of phenomena. The focus is on prevailing conditions, or on how a person, group, or thing behaves or functions in the present. It often involves some type of comparison or contrast.

3. *Experimental research* describes *what will be* when certain factors are carefully controlled. The focus is on cause-effect relationships; variables are carefully manipulated for the purpose of determining their influence.

A complete chapter is devoted to each of these three types of research; techniques of data gathering and areas of application are carefully considered.

SUMMARY

Man's desire to know about his world has led him from primitive superstition to modern scientific knowledge. From mysticism, dogma, and the limitations of unsystematic observation based upon personal experience, he has examined the process of thinking itself to develop the methods of deductive and inductive reasoning which have become the essence of scientific inquiry.

Although first applied as the methodology of the physical sciences, the process of scientific inquiry has become useful in the study of human behavior, resulting in the social sciences. The great challenge of the twentieth century calls for greater understanding of man and his behavior.

Fundamental research is the formal and systematic process of carrying on the scientific method of analysis and generalization, the deductive and inductive phases of reasoning. Fundamental research has increased and will continue to increase understanding of the teaching-learning process and the conditions under which it is most successfully carried on.

Action research, employing the spirit of fundamental research, has focused attention upon the solution of problems, rather than upon the formulation of theories. It is concerned with a particular group, rather than with people in general. It is concerned with immediate results, and is interested in the growth of the individuals involved in the research process. Action research appeals to teachers and other busy professional workers who have problems to solve. While there will always be a need for fundamental research and the development of more adequate theories of education, it is action research that will involve the classroom teacher, providing an avenue for professional growth and the improvement of the curriculum.

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SELECTION OF THE PROBLEM

ONE OF THE MOST DIFFICULT PHASES OF THE GRADUATE research project is the choice of a suitable problem. The beginner is likely to select a problem that is much too broad in scope. This may be due to his lack of understanding of the nature of research and systematic problem-solving activity. It may also be due to his enthusiastic, but naive, desire to solve an important problem quickly and immediately.

Those who are more experienced know that research is often tedious, painfully slow, and rarely spectacular. They realize that the search for truth and the solution of important problems take a great deal of time and energy and the intensive application of logical thinking. Before considering the ways in which problems may be identified, a discussion of a few of the characteristics of research and the activities of the researcher would seem appropriate.

Research makes its contribution to human welfare by countless small additions to knowledge. The researcher has some of the characteristics of the ant, who brings his single grain of sand to the anthill.

Research is more often a team endeavor than an individual one. Researchers working in groups attack problems in different ways, pooling their knowledge and sharing the results of their efforts. Highly publicized discoveries usually result from the cumulative efforts of many, working as teams, over long periods of time. They are rarely the product of a single individual working in isolation.

Great discoveries rarely happen by accident. When they do, the researcher is usually well-grounded and possesses the skill, known as serendipity, to recognize the significance of these fortunate occurrences. He is imaginative enough to seize the opportunity presented and to carry it through to a fruitful conclusion. Pasteur has observed that chance favors the prepared mind.

The researcher is a specialist, rather than a generalist. He employs the principle of the rifle rather than the shotgun, analyzing limited aspects of broad problems. Critics have complained that much social research consists of learning more and more about less and less until the researcher knows everything about nothing. This is a clever statement, but an exaggeration. The opposite danger characterizes much ineffective problem-solving; learning less and less about more and more until one knows nothing about everything.

The solution of educational problems is much more likely to result when, through research, individuals are willing to pool the results of their discoveries about limited aspects of problems. If there is a danger in too narrowly subdividing problems, it may result when the researcher loses sight of the problem and becomes engrossed in merely counting and tabulating data.

Research is more than compiling data. It is based upon the application of rigorous logic to problems, starting with certain hunches or assumptions that give direction to data-gathering. Then, by the process of testing the hypothesis, generalizations are established. The concept of testing implies an objectivity that lets the data lead where they will. Failure to substantiate the hypothesis in the testing process leads the researcher back to a modified hypothesis, which then becomes eligible for further testing and possible acceptance.

THE ACADEMIC RESEARCH PROJECT

A student's first research project is usually a college requirement, in partial fulfillment of the requirements of a graduate course, or for an advanced degree. The initial motivation may not be the desire to engage in research, but the practical need of meeting a requirement. Projects of this sort are justified on the grounds that once the student develops some competency in research procedures, he will use his "know-how" to seek solutions to educational problems, and thus make his contribution to the body of knowledge upon which professional practice is based.

Too often this expectation is not realized, for relatively few students who have had this research experience carry on further studies. This failure of classroom teachers to employ research procedures may be explained by heavy teaching loads, the lack of importance attached to research by school officials, the ineffectiveness of university programs in developing competent researchers, and the personal inertia of the teachers themselves.

During the past few years the increased emphasis upon action research has added impetus to research activity by classroom teachers. Confronting practical problems in their day-to-day tasks, they have found a practical challenge to apply the methods of research that they have learned.

Unfortunately, few research studies accomplished in fulfillment of academic requirements make a significant contribution to the development of new theories or to the improvement of educational practices. The limitations of time and financial resources, the lack of experience of the researcher, and the academic hazard of departing from relatively safe research projects all serve as limitations to significant contributions to the field.

Perhaps more significant master's degree or doctoral studies can be carried on under the direction of an advisor or major professor who is devoting his own interest to research in a major educational problem area. The studies of degree candidates thus may be directed towards certain restricted phases of the major problem, making possible long-term longitudinal studies. Such projects as those of A. S. Barr at the University of Wisconsin, on the measurement and prediction of teaching efficiency, and the studies of L. M. Terman at Stanford University on gifted children represent the cumulative attack on problems that is likely to yield more significant results than the uncoordinated investigations of candidates whose efforts lack this unifying direction and continuity.

In the light of the varied types and purposes of students' projects, the choice of a problem will depend upon the level at which the research is done. A problem that would be appropriate for a beginner in a first course in research would be necessarily different than that selected for the more rigorous requirements of the master's thesis or the doctoral dissertation. The first topic will necessarily be a modest one, which can be carried on by an inexperienced researcher in a limited period of time. The emphasis will be placed upon the learning process, rather than on its actual contribution to education. This statement does not imply that the product is necessarily unimportant. It merely recognizes that the limitations of the first research project place the emphasis on learning how, with the hope that subsequent investigations will progressively yield more significant contributions to the advancement of knowledge.

Some students choose a first problem that can be expanded later in a more mature treatment at the level of the master's thesis or the doctoral dissertation. The first study thus serves as an exploratory process.

THE SOURCES OF PROBLEMS

The choice of a suitable problem is always difficult. Problem awareness is not ordinarily a characteristic of the beginner, and even the more experienced researcher approaches this step with hesitancy. It is a serious responsibility to commit oneself to a problem that will inevitably require much time and energy, and upon which so much academic significance is based.

What are the most likely sources to which one may go for a suitable research problem, or from which one may develop a sense of problem awareness?

1. The classroom, school, or community is a logical source. Every teacher is confronted with day-to-day problems. Why do we do the things we do? Why do we teach the things we teach? Do we present ideas and concepts at the appropriate time and in the most effective sequence? How can we perform the daily teaching tasks more effectively? What is known about learning and teaching is inadequate in relation to what there is to know Many of our prevailing educational practices are based upon little or no substantial research evidence.

Many of the problems observed in the classroom, the school, or the community lend themselves to careful investigation. Perhaps they are of greater importance than those more remote from the teacher's experience. Teachers will discover acres of diamonds in their own backyards, and the possessor of the inquisitive and imaginative mind may translate one of these problems into a worthwhile and practicable research project.

2. Technological changes and social developments are constantly bringing forth new problems and new opportunities for research. A challenge to education has been introduced by the development of commercial and educational television, a field in which much research is needed. Decisions as to whether or not television will significantly alter the role of the classroom teacher must be based upon the contributions of careful research.

The fears and insecurities created by the Soviet Union's scientific education policies have raised a demand for drastic changes in the American secondary school. But the proposed solutions could possibly turn back the clock of educational experience unless they are solidly grounded in the evidence established by research.

3. The graduate academic experience should stimulate the questioning attitude towards prevailing practices and effectively promote problem awareness. Classroom lectures, class discussions, seminar reports, and out-of-class exchanges of ideas with fellow students and professors will suggest many stimulating problems to be solved. Students who are fortunate enough to have graduate assistantships have an especially advantageous opportunity to profit from the stimulation of close professional relationships with faculty members and fellow assistants.

Reading assignments in textbooks, special assignments, reports, and term papers will suggest additional areas of needed research. Such specialized sources as the *Encyclopedia of Educational Research, Psychological Abstracts,* the *Review of Educational Research,* the *Journal of Experimental Education,* the *Journal of Educational Research,* master's theses in education, *Dissertation Abstracts,* and many similar publications, are rich sources for problem seekers.[1]

4. Consultation with the course instructor, advisor, or major professor is helpful. Several writers have ridiculed the student who expects the advisor to assign a problem. Although research problems are not assigned, consultation with the more experienced faculty member is a desirable practice.

Most students feel insecure as they approach the choice of a research problem. They wonder if the problem they may have in mind is significant enough, feasible, and reasonably free of unknown hazards. To expect the beginner to arrive at the advisor's office with a completely acceptable problem is quite unrealistic. One of the most important functions of the research advisor is to help the student clarify his thinking, achieve a sense of focus, and develop a manageable problem from one that may be vague and too complex.

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[1] These sources are described in Chapter 3, "The Use of Reference Materials."

Evaluating the problem

Before the proposed research problem can be considered appropriate, several searching questions should be raised. Only when those questions are answered in the affirmative can the problem be considered a good one.

1. Is this the type of problem that can be effectively solved through the process of research? Do the data exist upon which a solution may be based?

2. Is the problem significant? Is an important principle involved? Would the solution make any difference as far as educational theory and practice are concerned? If not, there are undoubtedly more significant problems waiting to be investigated.

3. Is the problem a new one? Is the answer already available? Ignorance of prior studies may lead a student to needlessly spend time on a problem already investigated by some other worker.

While novelty or originality is an important consideration, the fact that a problem has been investigated in the past does not mean that it is no longer worthy of study. There is constant need for verification of the findings of previous investigations, using newer and better devices and procedures. There is also a need for the testing of former findings under changed cultural conditions.

4. Is the problem feasible? After a research project has been evaluated, there remains the problem of suitability for a particular researcher. While the problem may be a good one, is it a good problem for me? Will I be able to carry it through to a successful conclusion? Some of the questions that should be raised are:

a) Do I have the necessary competence to plan and carry out a study of this type? Do I know enough about this field to understand its significant aspects and to interpret my findings? Am I skillful enough to develop, administer, and interpret the necessary data-gathering devices and procedures? Am I well-grounded in the necessary knowledge of statistical techniques?

b) Are pertinent data accessible? Are valid and reliable data-gathering devices and procedures available? Will school authori-

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ties permit me to contact the students, conduct necessary experiments or administer necessary tests, interview teachers, or have access to important cumulative records? Will I be able to get the sponsorship necessary to open doors that otherwise would be closed to me?

c) Will I have the necessary financial resources to carry on this study? What will be the expense involved in data-gathering equipment, printing, test materials, travel, and clerical help? If the project is an expensive one, what is the possibility of getting a grant from a philanthropic foundation or agency?

d) Will I have enough time to complete the project? Will there be time to devise the procedures, select the data-gathering devices, gather and analyze the data, and complete the research report? Since most academic programs impose time limitations, certain worthwhile projects of a longitudinal type are precluded.

e) Will I have the courage and determination to pursue the study in spite of the difficulties and social hazards that may be involved? Will I be willing to work aggressively when data are difficult to gather and when others are reluctant to cooperate?

Will I be willing to risk the criticism, suspicion, or even opposition that a delicate or controversial study may raise? Sex education, racial integration, communism, and other controversial problems are almost certain to stir up emotional reactions in certain quarters.

THE AGENDUM OR RESEARCH PROPOSAL

The preparation of an agendum, or research proposal, is an important step in the research process. Many institutions require that a proposal be submitted before any project is approved. This provides a basis for the evaluation of the project, and gives the advisor a basis for assisting during the period of his direction. It also provides a systematic plan of procedure for the researcher to follow.

The agendum is comparable to the blueprint which the architect prepares before the bids are let and building commences. The initial draft of the agendum is subject to modification in the light of the analysis by the student and his project advisor. Since good research must be carefully planned and systematically carried out, procedures that are improvised from step to step will not suffice. Only with a well-designed agendum will a worthwhile research project be likely to result.

The list which follows presents the essential parts of a research proposal, with a brief explanation of each step.

1. *The statement of the problem, either in question form or as a declarative statement.* This attempt to focus on a clear goal gives direction to the research process. It must be limited enough in scope to make a definite conclusion possible. The major statement or question may be followed by minor statements or questions.

It may be appropriate here to formulate a major hypothesis and several minor hypotheses. A good hypothesis has several basic characteristics:

1. It should be reasonable.
2. It should be consistent with known facts.
3. It should be stated in such a way that it can be tested as true or false.
4. It should be stated in as simple terms as possible.

Following these statements of hypothesis, possible conclusions may be suggested. This approach clearly establishes the nature of the problem and the logic underlying the investigation, and gives direction to the data-gathering process.

2. *The significance of the problem.* It is important that the researcher point out how the answer to the question or the solution to the problem can influence educational theory or practice. Careful formulation and presentation of the implications or possible applications of knowledge helps to give the project an urgency, justifying its worthwhileness.

Failure to include this step in the proposal may well leave the researcher with a problem without significance—a search for data of little ultimate usefulness. Many of the tabulating types of research problems should be abandoned if they do not withstand the critical test of significance. Perhaps university library shelves would not groan with the weight of so many unread and forgotten dissertations if this process had been rigorously applied. With so many gaps in educational theory, and so many areas of educational practice in need of improvement, there is little justification for the expenditure of research effort on trivial or superficial investigations.

3. *Definitions, assumptions, and limitations.* It is important to define all unusual terms that could be misinterpreted. This definition helps to establish the frame of reference with which the researcher approaches the problem. The assumptions that the researcher makes, and the restrictions and limitations that he recognizes, must be frankly stated. This recognition helps to focus attention on valid objectives, and helps to minimize the dangers of overgeneralization.

4. A résumé of related literature. This brief summary of previous research and the writings of recognized experts provides evidence that the researcher is familiar with what is already known, and what is still unknown and unproven. Since effective research must be based upon past knowledge, this step would help to preclude the duplication of what is known, and provide helpful suggestions for future investigation.

5. *A careful and detailed analysis of proposed research procedures.* This part of the proposal identifies the entire research plan. It describes just what must be done, how it will be done, what data will be needed, what data-gathering devices will be employed and an evaluation of their validity and reliability, how sources of data will be selected, and how the data will be analyzed and conclusions reached.

6. *A time schedule.* A schedule should be prepared so that the researcher may budget his time and energy effectively. Dividing the project into parts and assigning dates for the completion of each part helps to systematize the project and minimize the natural tendency to procrastinate.

Some phases of the problem cannot be started until other phases have been completed. Some parts of the final research report, such as the review of related literature, can be completed and typed while waiting for the data to be gathered. Since academic research projects usually involve rather critical time limitations and definite deadlines for filing the completed report, this preplanning of procedures with definite date goals is most important.

THE PROGRESS REPORT

From time to time the major professor or advisor may request a progress report indicating how well the project is progressing. This device also serves as a stimulus, helping the researcher to move systematically towards the goal of completing the project.

THE FIRST RESEARCH PROJECT

Experience has indicated that one of the best ways to understand the methodology and processes of research is to actually engage in research. Such a project may be very modest in nature and necessarily limited by time, the experience of the student, and many other factors associated with the graduate student's home and teaching obligations. However, the methodology may be learned by this doing and thinking, under the careful supervision of the instructor of the beginning course in research. Respectable research projects have been carried on and reported within a semester's time, even within an eight-week summer session. While most of these studies have been of the descriptive-survey type, some simple historical and experimental studies have been completed.

The emphasis must necessarily be on the process rather than on the product or its contribution to the improvement of educational practice. A study chosen for this first project may not be of great enough significance to serve as an appropriate thesis problem.

The activity may be an individual or a group enterprise. Groups of three to five graduate students can profitably work together on the planning of the study. Data-gathering devices may be chosen or constructed through joint enterprise. Data may be gathered within the university graduate class, or in the classrooms, schools, or communities in which the groups members teach. However, it is recommended that the next steps—organization and analysis of data and the writing the final report—be an individual project. There is always the danger in a group project of "letting George do it," and incidentally letting George get all of the values of the experience.

This recommended combination of group effort in the initial stages and individual effort in the later stages represents a compromise that seems effective, and enables students to carry through a study in a limited amount of time with reasonable opportunity for personal growth in the process. For some of those who plan to write a thesis in partial fulfillment of degree requirements, this first project may serve as preparation. For others, it may initiate a study capable of subsequent expansion into a thesis or dissertation.

RESEARCH TOPICS USED BY STUDENTS IN A BEGINNING GRADUATE COURSE IN EDUCATIONAL RESEARCH

1. Entrance Requirements of Indiana Colleges
2. Reading Habits of a Group of Teachers
3. Community Attitudes toward Extra-Class Activities
4. Television Viewing Habits of Fifth Grade Students
5. An Analysis of Errors of Beginning Typists
6. Attitudes of Teachers toward Racial Integration in the Secondary School
7. A Comparison of the Academic Achievement of Athletes and Non-athletes at Kokomo High School
8. Factors Associated with Delinquency in a Group of Boys at the Indiana Boys School
9. An Analysis of Masters' Degree in Education Programs in a Group of Midwest Universities
10. Attitudes of Teachers towards Federal Aid to Education
11. A Follow-Up Study of Nonpromoted Students at School #86.
12. The Status of Latin in Indiana High Schools
13. Attitudes of High School Seniors towards Proposed Compulsory Military Training
14. Fund-Raising Activities at Columbus High School

15. Criteria Used in Determining School Marks
16. An Analysis of Problems of High School Freshmen as Indicated by the Mooney Problems Check List
17. A Follow-Up Study of the 1950 Graduates of Hanover College
18. Absenteeism among Freshmen at Southport High School
19. The Use of Audio-Visual Aids in Hamilton County High Schools
20. Library Facilities in Warren Township Schools
21. Class Size in Wayne Township Elementary Schools
22. Parents' Attitude towards School Discipline
23. Why Freshmen Chose Butler University
24. Allowances and Earnings of Pike Township High School Seniors
25. What Pupils Like and Dislike in Teachers
26. Discipline Problems at Washington High School as Viewed by the Teachers
27. Discipline Problems at Washington High School as Viewed by the Seniors
28. The Predictive Value of SCAT Test Scores at Butler University.
29. Why Teachers Leave Teaching
30. A Comparison of Vocabulary Levels in Three Textbook Series in Reading
31. Factors Underlying the Choice of Teaching as a Profession
32. The Predictive Value of Entrance Examinations at the Methodist Hospital School of Nursing
33. Teacher Expenditures for Professional Improvement
34. Teacher Attitude toward the Year-Round School Program
35. Outside Nonteaching Employment of Teachers
36. Truancy in Boone County High Schools
37. A Comparison between Two Methods of Teaching Typing
38. The Instrumental Music Budgets of a Group of Central Indiana High Schools
39. Expenses Involved in Extra-Class Participation at Madison High School
40. The Treatment of Educational Topics in the Indianapolis *Times*
41. The Influence of Color Combinations in the Teaching of Spelling
42. Student Publications in Miami County High Schools
43. The Treatment of Communism in Social Problems Textbooks
44. Social Studies Teacher Certification Requirements in Ten Midwestern States
45. The Influence of Background Music on Learning to Spell in the Sixth Grade
46. The Summer Employment of High School Juniors

47. Career Guidance Programs in Indianapolis High Schools
48. The Predictive Value of Reading Readiness Test Scores at Orchard School
49. The Newspaper Reading Habits of a Group of Teachers
50. An Analysis of the Cafeteria Eating Habits of Shortridge High School Sophomores

SUMMARY

Beginning research students tend to choose problems too broad in scope. They do not always understand the highly specialized nature of research activity. Because the first project is usually the result of a requirement to be met, their motivation is not always a genuine desire to carry on research.

Few academic research projects make a significant contribution to educational theory or practice. Too few academic researchers continue to engage in research activity after they leave the university. The recent emphasis on action research, however, has had an encouraging effect on research by classroom teachers.

Problems are found in the teachers' daily classroom, school, and community experiences. Technological and social changes call for research evidence to chart new courses in educational practice. Graduate academic experience helps to promote problem awareness through activities of the classroom, reading, and interaction with fellow students, instructors, and advisors.

A good research problem has the qualities of significance, originality, and feasibility. The researcher should evaluate a proposed problem in the light of his competence, the availability of data, the financial demands of the project, the limitations of time, and the possible difficulties and social hazards involved.

An agendum, or research proposal, is required by many institutions, and serves as a useful basis for the evaluation of a project as well as a guide for the researcher. The agendum contains a clear and concise statement of the problem, the hypothesis or hypotheses involved, a recognition of the significance of the problem, definitions of important terms, assumptions and limitations, a résumé of related literature, an analysis of proposed research procedures, and a time schedule. Some advisors request a progress report from time to time in order to evaluate the progress of the investigation.

An effective way to learn about research is to carry on a modest research project. This group or individual activity may be carried on in connection with the beginning course in educational research, with emphasis on the process rather than upon the contribution of the study to educational practice.

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3

THE USE OF REFERENCE MATERIALS

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PRACTICALLY ALL HUMAN KNOWLEDGE CAN BE FOUND in books and libraries. Unlike other animals that must start anew with each generation, man builds upon the accumulated and recorded knowledge of the past. His constant adding to the vast store of knowledge makes possible progress in all areas of human endeavor.

Undergraduate students sometimes receive special instruction in the use of the library and its facilities, but too often their library activities are confined to assigned and suggested readings. Graduate students must find their own references. Few graduate students, however, and not all faculty members, have an adequate familiarity with the library and its many resources for the effective search for specialized knowledge.

Extensive use of the library and thorough investigation of related literature is essential in preparing graduate term papers, seminar reports, and in planning and carrying out the kind of searching involved in special field problems, theses, and dissertations.

The search for reference material is a time-consuming but fruitful phase of the graduate program. A familiarity with the literature in any problem area helps the student to discover what is already known, what others have attempted to find out, what methods of attack have been promising or disappointing, and what problems remain to be solved. Knowing how to use the library effectively should receive primary emphasis in the graduate program in education. To know what sources to use, what sources are available, and where and how to find them will save many hours of aimless activity.

LEARNING TO USE THE LIBRARY

The graduate student should become thoroughly acquainted with the university library, the location of its varied facilities, and the regulations governing the use and circulation of materials. Many university libraries have a printed guide that contains helpful information. A diagram may indicate the location of the stacks, the periodicals room, the reference division, reading rooms, and special collections of books, microfilm or microcard equipment, clippings, manuscripts, or pamphlets. Another useful part of the guide may list the periodicals to which the library subscribes and the names of special indexes, abstracts, and other references available. A third section may deal with the regulations concerning the use of the stacks, the use of reserve books, and the procedures for securing materials held by the library or those that may be procured from another library.

It is well to use the skill and knowledge of librarians, who are anxious to help the student find reference materials. The graduate student should not depend too much on the librarian, however, but should learn to find his own references.

Ordinarily, undergraduates fill out call slips for presentation at the circulation desk, when they wish to use a book. Faculty members and graduate students are usually given a card giving them access to the stacks, and thus may carry on the independent searching and browsing not possible when each book must be requested by name.

Most libraries prefer that students not replace books on the shelves after they have been used, for a misplaced book creates confusion both for librarians and other students seeking it. If students leave the books with which they are finished on the tables, the librarians will return them to their proper position on the shelves.

Sometimes a student learns of a reference that is not available in the local library. Many libraries subscribe to a "union" catalogue, which lists references found in other libraries. Most libraries have a union list of serials to indicate the libraries where particular serial publications may be obtained. There are a number of ways in which these materials may be obtained by a library:

1. *By interlibrary loan.* The library may request that the work be sent and then checked out to the user. Note that the library must request this material. It is never sent directly to the user.

2. *By requesting a photostatic copy* of a page or of a number of pages of a desired reference.

3. *By requesting a microfilm.* For an established fee a microfilm may be purchased. This may be projected on library microfilm equipment.

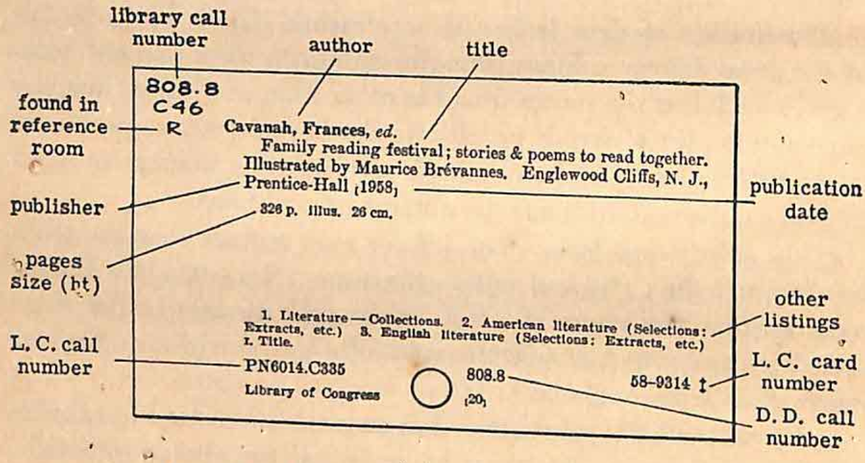
4. *By an abstracting or translating service.* Some large libraries provide copied or translated portions of needed materials at an established fee.

In connection with any of the above services, the user is expected to bear the costs involved in reproducing, handling, and shipping the materials.

* THE CARD CATALOGUE

The card catalogue, an alphabetical listing, may be compared to the index of a book.* It is the index to the entire library, listing the contents of all publications found in the library, with the exception of serially published periodicals. These compact 3″x5″ card forms provide a quick and convenient way to find all of the books, monographs, or pamphlets found on the library shelves.

The cabinet drawers of the card catalogue are alphabetically labeled, and also numbered sequentially, to facilitate replacing them in the proper place when they have been removed. Printed cards are prepared by the H. W. Wilson Company or by the Library of Congress. College and university libraries usually use these prepared cards. Smaller libraries often prepare their own.



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Cavanah, Frances, *ed.*
Family reading festival; stories & poems to read together. Illustrated by Maurice Brévannes. Englewood Cliffs, N. J., Prentice-Hall [1958]
326 p. illus. 26 cm.

1. Literature — Collections. 2. American literature (Selections: Extracts, etc.) 3. English literature (Selections: Extracts, etc.) I. Title.

PN6014.C335 808.8 58-9314 ‡
Library of Congress [20]

Fig. 3-1 Library of Congress author card.

When printed cards are used, they contain a great deal of useful information. The card illustrated in Fig. 3-1 is a typical Library of Congress card. The "call number" in the upper left corner is written in by the librarian. For the sake of convenience in finding books, the card catalogue has two and often three listings for each book. A few libraries have a fourth card for some books.

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* In this chapter, all references regarded by the author as basic to research in education will be marked, as here, with an asterisk.

1. author card
2. subject card
3. title card
4. analytical card

The author card is filed, last name first (Alexander, Carter). One can find any or all publications credited to the author. In the case of joint authorship a card is filed separately for each author. Societies, associations, editors of yearbooks, committees, and government departments are listed as authors when no author is credited with the publication.

The subject card is filed under the appropriate heading. Since headings run from general to specific, *counseling*, a subtopic, would follow *guidance*. When a book is about an author, his name is considered a subject. Books about John Dewey are listed under the subject, *Dewey, John*.

The title card is filed under the actual name of the book. Initial articles, *a*, *an*, or *the* are disregarded. Thus, *The Elements of Research* is filed under *Elements of Research*.

The analytical card, used by some large libraries, provides a reference to important sections of a book that deal with an important subject or person. For example, De Kruif's *Microbe Hunters* has a section on Ehrlich which can be called to the attention of the reader by the special analytical card. This title, filed separately, indicates that the volume has a section on the person or topic cited.

Ordinarily, the card catalogue covers only the books in that specific library. In very large university libraries there may be found the union catalogue, which contains duplicates of the card catalogue of the Library of Congress, or duplicates of cards found in other important libraries in the United States. Instead of a union catalogue, some libraries have a photoprinted, bound-book copy of the Library of Congress catalogue, eighteen cards to a page.

LIBRARY CLASSIFICATION

Library systems of book classification are complex but ingenious ways of systematizing the placement and location of books. There is a tremendous amount of detail involved in these systems, but they have been devised in a logical and neat way. Library classification is a science based upon a methodology that is logical and orderly to the smallest detail. While it is beyond the scope of this chapter to explain all of the details of book classification, a few principles and procedures are presented that should prove helpful to the library user.

The call number

Most libraries use the Dewey Decimal system of classification, as published by Melvil Dewey (1851–1931) in 1876 and adopted by the Amherst College Library in 1873. The system, or some modification of it, is now used in 89% of the college and university libraries, 96% of public libraries, and in 64% of all special libraries in the United States. It is also widely used in libraries in England and in other parts of the world.

000		General references, periodicals, cyclopedias, biography
100		Philosophy, psychology
200		Religion
300		Social Sciences
	310	Statistics
	320	Political Science
	330	Economics
	340	Law
	350	Administration
	360	Welfare Assns. and Institutions
	370	Education (General)
	370.1	Theory and Philosophy of Education
	370.9	History of Education
	371	Teachers—Methods
	372	Elementary Education
	373	Secondary Education
	374	Adult Education

	375	Curriculum
	376	Education of Women
	377	Religious, ethical education
	378	Higher Education
	379	Public Schools (Relation of State to Education)
	379.14	School Law
	379.15	Supervision and Control
	380	Commerce, Communications
	390	Customs
400		Linguistics
500		Pure Science
600		Applied Science
700		Arts and Recreation
800		Literature
900		History

It will be noted that the Dewey Decimal system is, as its title indicates, a decimal plan, the numbers running from 001 to 999.99. Following is a typical breakdown:

001 –300
300 –370
370 –379
379.1 –379.9
379.91–379.99

Library of Congress system

Some of the more extensive libraries, particularly in large universities, use the Library of Congress system of book classification, published in 1902. This system, devised by Dr. Herbert Putnam and authorized by an act of Congress in 1880, is especially useful in large libraries consisting of individual collections, housed separately. It provides for twenty main classes instead of the ten of the Dewey Decimal system. Letters of the alphabet are used for the principal headings, but numerals are used for further subgrouping in a fashion somewhat similar to the Dewey Decimal system.

The tremendous size of the national Library of Congress at Washington is evidenced by its growth from two million volumes in 1899 to over twenty-nine million volumes in 1950.

Below is a listing of the main classifications in the Library of Congress System:

A		General Works
B		Philosophy, Religion
C		History
D		World History
EF		American History
G		Geography, Anthropology
H		Social Sciences
I		vacant
J		Political Science
K		Law
L		Education
	LA	History of Education
	LB	Theory of Education
	LC	Special forms and applications
	LD	U. S. Schools
	LE	American Education (Outside U. S.)
	LF	European Education
	LG	Asia, Africa, Oceana
	LH	School Periodicals
	LI	vacant
	LJ	Fraternities, Societies
	LT	Textbooks
M		Music
N		Fine Arts
O		vacant
P		Language, Literature
Q		Science
R		Medicine
S		Agriculture
T		Technology
U		Military Science
V		Naval Science
W		vacant
X		vacant
Y		vacant
Z		Library Science—Bibliography

Book placement

All books have a call number or letter that appears in the upper left-hand corner of the author, subject, or title card, and on the spine of the book itself. Books are placed on the library shelves serially by call numbers or letters. Within each classification the books are arranged alphabetically by author's last name. An exception to this rule is that biographies are placed under the subject, rather than the author, of the book.

Most libraries use an additional classification device known as the Cutter-Sanborn System. This system adds author numbers to the basic classification to represent the first letter of the author's name, and additional numbers to distinguish between authors whose names begin with the same initial.

Other systems such as the Bliss, Quinn Brown, Universal Decimal, and Colon systems are described in the specialized literature of book classification in library science.

GENERAL REFERENCES

There are several basic reference books, with which all graduates should be familiar, that list many types of references and cover practically all areas of human knowledge.

Constance M. Winchell, ed., *A Guide to Reference Books*, 7th ed. Chicago: American Library Association, 1951. 645 pp. 1st supplement, 1954. 117 pp. 2nd supplement, 1956. 134 pp.

This comprehensive work, edited by Isadore A. Mudge from 1936 to 1950, lists by subject area, by type of reference, and by author or editor the most important reference books printed not only in English but in other languages. A section is devoted to education.

Louis Shores, ed., *Basic Reference Sources*. Chicago: American Library Association, 1954. 378 pp.

A comprehensive review of all types of references. An especially valuable feature is the description and evaluation of the sources mentioned. The usefulness of similar sources is compared.

Mary N. Barton, ed., *Reference Books*. 2nd ed. Baltimore: Enoch Pratt Free Library, 1951. 99 pp.

This shorter guide lists reference books in many areas and includes helpful descriptive comments on their use.

* Carter Alexander and Arvid J. Burke, *How to Locate Educational Data and Information*, 4th ed. New York: Bureau of Publications, Teachers College, Columbia University, 1958. 436 pp.

This specialized volume lists many reference sources in education and describes the contents of each source and how it should be used. It also has valuable suggestions on the use of the library, and is probably the most important single reference on references for graduate students in education.

PERIODICALS

Up-to-date treatment of educational problems, contemporary opinions, and the latest reviews and reports of educational research will be found in periodicals or serials. A periodical or serial is defined as "a publication issued in successive parts, usually at regular intervals, and, as a rule, intended to be continued indefinitely."[1] Included in this definition are almanacs, yearbooks, directories, handbooks, government documents, publications of societies and associations, and newspapers and magazines.

Without comprehensive guides the searching of thousands of periodicals would be a nearly impossible task. Fortunately, a number of useful indexes and abstracts are available to the student in education.

THE INDEX

A periodical index serves much the same purpose as the index of a book or the card file of the library. Usually listing articles alphabetically under subject, title, and author headings, it identifies the source of the articles cited. Readers should read the directions of any index carefully before trying to find references. Most indexes provide complete directions, as well as a list of the periodicals covered, the dates of issues included, the proper volume, and a key to all abbreviations used.

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[1] Louis Shores, ed., *Basic Reference Sources* (Chicago: American Library Association, 1954), p. 160.

* *Education Index.* New York: H. W. Wilson Co., 1929-date. Published in three editions: paperbound, monthly (September through June); clothbound, annually (cumulative, June); and clothbound, every three years (issues dated 1953–56, etc.).

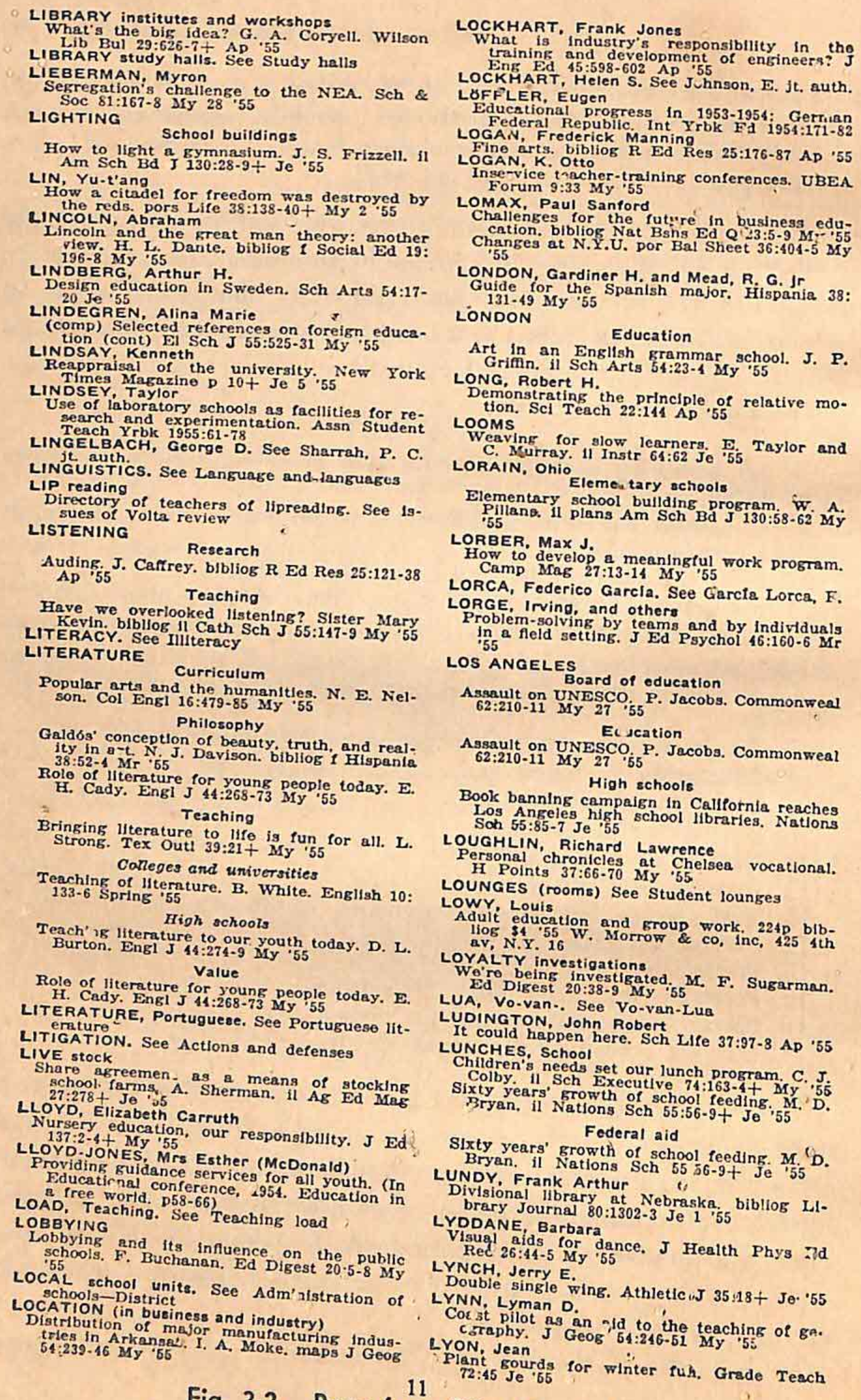
Of a number of indexes and abstracts that will be described, the *Education Index* is the most valuable single source or guide to periodic literature in education. Since its first publication in January, 1929, it has served as a comprehensive index of practically all publications in the area of education.

The *Education Index* lists:

1. All books on professional education including college textbooks in education.
2. Yearbooks and other publications of professional societies, associations, and institutions.
3. Bulletins, monographs, and reports on education.
4. Publications of the United States Office of Education.
5. Publications of the National Education Association and its many member organizations.
6. Articles in most educational periodicals (over 175 periodicals are indexed).
7. Articles on education in nonprofessional publications.
8. Bibliographies published.
9. Book reviews and book lists.
10. Biographies of educators.
11. Courses of study published.
12. Resource and teaching units.
13. Tests, scales, inventories, workbooks, handbooks, and manuals.
14. Reference books.
15. Poems.
16. Portraits (por.) and illustrations (illus.).
17. Names of foundations and associations.
18. Meeting dates of professional education associations.

The references appear in the paperbound monthly edition two or three months after the articles appear in the periodicals. College and university libraries, most large public libraries, and many small libraries subscribe to the *Index*. The price of the service is based upon the number of listed periodicals to which the library subscribes, making it less expensive for smaller libraries, which do not take as many periodicals.

In using the *Index* it is often advisable to use past cumulative



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What's the big idea? G. A. Coryell. Wilson Lib Bul 29:626-7+ Ap '55
LIBRARY study halls. See Study halls
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Segregation's challenge to the NEA. Sch & Soc 81:167-8 My 28 '55
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School buildings

How to light a gymnasium. J. S. Frizzell. il Am Sch Bd J 130:28-9+ Je '55
LIN, Yu-t'ang
How a citadel for freedom was destroyed by the reds. pors Life 38:138-40+ My 2 '55
LINCOLN, Abraham
Lincoln and the great man theory: another view. H. L. Dante. bibliog f Social Ed 19: 196-8 My '55
LINDBERG, Arthur H.
Design education in Sweden. Sch Arts 54:17-20 Je '55
LINDEGREN, Alina Marie
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LINDSAY, Kenneth
Reappraisal of the university. New York Times Magazine p 10+ Je 5 '55
LINDSEY, Taylor
Use of laboratory schools as facilities for research and experimentation. Assn Student Teach Yrbk 1955:61-78
LINGELBACH, George D. See Sharrah, P. C. jt. auth.
LINGUISTICS. See Language and languages
LIP reading
Directory of teachers of lipreading. See issues of Volta review
LISTENING

Research

Auding. J. Caffrey. bibliog R Ed Res 25:121-38 Ap '55

Teaching

Have we overlooked listening? Sister Mary Kevin. bibliog il Cath Sch J 55:147-9 My '55
LITERACY. See Illiteracy
LITERATURE

Curriculum

Popular arts and the humanities. N. E. Nelson. Col Engl 16:479-85 My '55

Philosophy

Galdós' conception of beauty, truth, and reality in art. N. J. Davison. bibliog f Hispania 38:52-4 Mr '55
Role of literature for young people today. E. H. Cady. Engl J 44:268-73 My '55

Teaching

Bringing literature to life is fun for all. L. Strong. Tex Outl 39:21+ My '55

Colleges and universities

Teaching of literature. B. White. English 10: 133-6 Spring '55

High schools

Teaching literature to our youth today. D. L. Burton. Engl J 44:274-9 My '55

Value

Role of literature for young people today. E. H. Cady. Engl J 44:268-73 My '55
LITERATURE, Portuguese. See Portuguese literature
LITIGATION. See Actions and defenses
LIVE stock
Share agreements as a means of stocking school farms. A. Sherman. il Ag Ed Mag 27:278+ Je '55
LLOYD, Elizabeth Carruth
Nursery education, our responsibility. J Ed 137:2-4+ My '55
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Providing guidance services for all youth. (In Educational conference, 1954. Education in a free world. p58-66)
LOAD, Teaching. See Teaching load
LOBBYING
Lobbying and its influence on the public schools. F. Buchanan. Ed Digest 20:5-8 My '55
LOCAL school units. See Administration of schools—District
LOCATION (in business and industry)
Distribution of major manufacturing industries in Arkansas. I. A. Moke. maps J Geog 54:239-46 My '55
LOCKHART, Frank Jones
What is industry's responsibility in the training and development of engineers? J Eng Ed 45:598-602 Ap '55
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LÖFFLER, Eugen
Educational progress in 1953-1954: German Federal Republic. Int Yrbk Ed 1954:171-82
LOGAN, Frederick Manning
Fine arts. bibliog R Ed Res 25:176-87 Ap '55
LOGAN, K. Otto
In-service teacher-training conferences. UBEA Forum 9:33 My '55
LOMAX, Paul Sanford
Challenges for the future in business education. bibliog Nat Bsns Ed Q 23:5-9 Mr '55
Changes at N.Y.U. por Bal Sheet 36:404-5 My '55
LONDON, Gardiner H. and Mead, R. G. jr
Guide for the Spanish major. Hispania 38: 131-49 My '55
LONDON

Education

Art in an English grammar school. J. P. Griffin. il Sch Arts 54:23-4 My '55
LONG, Robert H.
Demonstrating the principle of relative motion. Sci Teach 22:144 Ap '55
LOOMS
Weaving for slow learners. E. Taylor and C. Murray. il Instr 64:62 Je '55
LORAIN, Ohio

Elementary schools

Elementary school building program. W. A. Pillans. il plans Am Sch Bd J 130:58-62 My '55
LORBER, Max J.
How to develop a meaningful work program. Camp Mag 27:13-14 My '55
LORCA, Federico Garcia. See Garcia Lorca, F.
LORGE, Irving, and others
Problem-solving by teams and by individuals in a field setting. J Ed Psychol 46:160-6 Mr '55
LOS ANGELES

Board of education

Assault on UNESCO. P. Jacobs. Commonweal 62:210-11 My 27 '55

Education

Assault on UNESCO. P. Jacobs. Commonweal 62:210-11 My 27 '55

High schools

Book banning campaign in California reaches Los Angeles high school libraries. Nations Sch 55:85-7 Je '55
LOUGHLIN, Richard Lawrence
Personal chronicles at Chelsea vocational. H Points 37:66-70 My '55
LOUNGES (rooms) See Student lounges
LOWY, Louis
Adult education and group work. 224p bibliog $4 '55 W. Morrow & co, inc, 425 4th av, N.Y. 16
LOYALTY investigations
We're being investigated. M. F. Sugarman. Ed Digest 20:38-9 My '55
LUA, Vo-van-. See Vo-van-Lua
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It could happen here. Sch Life 37:97-8 Ap '55
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Children's needs set our lunch program. C. J. Colby. il Sch Executive 74:163-4+ My '55
Sixty years' growth of school feeding. M. D. Bryan. il Nations Sch 55:56-9+ Je '55

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Divisional library at Nebraska. bibliog Library Journal 80:1302-3 Je 1 '55
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Visual aids for dance. J Health Phys Ed Rec 26:44-5 My '55
LYNCH, Jerry E.
Double single wing. Athletic J 35:18+ Je '55
LYNN, Lyman D.
Coast pilot as an aid to the teaching of geography. J Geog 54:246-51 My '55
LYON, Jean
Plant gourds for winter fun. Grade Teach 72:45 Je '55

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Fig. 3-2. Page from *Education Index.*

issues, for references are not carried from one three-year book to the next. It is often helpful to know when a particular topic or problem was of current interest for *Index* issues from that period will yield more and better references.

For example, in 1954 the author found few references on articles dealing with cheating or dishonesty in the classroom. However, many references were found in the 1952 issue and the 1950–53 cumulative issue, for at this time the public interest and professional concern had been aroused by the exposures of cribbing at the United States Military Academy in 1951.

* ***Readers' Guide to Periodic Literature.*** **New York: H. W. Wilson Co., 1900-date.**

This guide indexes articles of a popular and general nature. Prior to 1929, when the *Education Index* was established, *Readers' Guide* covered many of the educational journals. By 1929, the volume of educational periodicals and literature had become so great that the *Education Index* was established as a more specialized guide.

Readers' Guide is helpful to students in education in finding references to articles in areas outside the field of professional education.

Abridged Readers' Guide to Periodic Literature. **New York: H. W. Wilson Co., 1935-date.**

Indexes the thirty-five selected periodicals most often found in smaller libraries.

* ***International Index to Periodic Literature.*** **New York: H. W. Wilson Co., 1913-date.**

Indexes alphabetically, by author and subject, articles from over 175 periodicals in the social sciences and the humanities, including many published outside the United States. Issued quarterly, cumulated annually and every three years.

Subject Guide to Books in Print. **New York: R. R. Bowker Co., 1957. 1425 pp.**

A comprehensive list of 91,000 in-print titles, of 861 publishers, under 22,000 subject headings, and with 28,000 cross-references.

National Education Association. *Publications List.* Washington: the Association.

Published annually, this list includes all books, pamphlets, periodicals, audio-visual material, research reports, and proceedings of the association. Over one thousand publications are listed in the 1957–58 edition.

* *Cumulative Book Index.* New York: H. W. Wilson Co., 1928-date.

This monthly publication indexes all books published in the English language by author, title, and subject. It is helpful in assuring the student that all pertinent published books have been covered in his researches. It is cumulated twice yearly, in July and December, and also bound into one or two year cumulations.

Bibliographic Index. New York: H. W. Wilson Co., 1938-date.

Published quarterly, and cumulated annually and every six years. A bibliography of bibliographies covering over 1,500 periodicals and books in all areas.

Public Affairs Information Service Bulletin. New York: Public Affairs Information Service, 1915-date.

Published weekly, and cumulated quarterly and annually. Lists, by subject, all articles in books, pamphlets, government publications, periodicals, and society publications dealing with social, political, and economic affairs in the English language throughout the world.

* *Elementary School Journal.* Chicago: The University of Chicago Press. Issued ten times each year.

Each issue includes a bibliography covering some phase of elementary education, each phase being covered regularly each year.

* *School Review.* Chicago: The University of Chicago Press. Issued ten times each year.

Each issue includes a bibliography covering some area of secondary education. The schedule of topics is systematized so that particular areas are covered annually.

* *Dissertation Abstracts.* Ann Arbor, Michigan: University Microfilms, 1955-date. This publication is the result of a merger between *Microfilm Abstracts.* Ann Arbor: 1952–55; and *Doctoral Dissertations Accepted by American Universities.* New York: H. W. Wilson Co., 1933–55.

Issued monthly and indexed annually, *Dissertation Abstracts* alphabetically lists doctoral dissertations accepted by over 130 colleges and universities in the United States and Canada, classified by subject field, institution, and author. This agency microfilms dissertations, regardless of length, for a nominal fee. Libraries may purchase complete microfilm copies or even individual pages.

Stanley B. Brown and Mary L. Lyda, eds., *Research Studies in Education.* Bloomington, Ind.: Phi Delta Kappa, 1953-date.

A listing of doctoral dissertations and field studies in education completed or underway. The 1957 edition lists authors alphabetically, and includes an up-to-date bibliography in research methodolgy by Carter V. Good.

T. A. Lamke and H. M. Silvey, eds., *Masters' Theses in Education.* Cedar Falls, Ia.: Research Publications, 1952-date.

Issued annually, this publication lists most theses written in partial fulfillment of master's degree requirements in American and Canadian colleges and universities. Titles are listed alphabetically by area, state, institution, and author.

Thomas K. Cureton, *Masters' Theses in Health, Physical Education and Recreation.* Washington: American Association of Health, Physical Education and Recreation, 1952. 292 pp.

An index of 3,878 research studies classified by topic and by methods.

Walter Monroe and Louis Shores, *Bibliographies and Summaries in Education to July, 1935.* New York: H. W. Wilson Co., 1936. 470 pp.

Covers more than 4,000 annotated bibliographies and summaries by author and subject for the period 1910–35. For later bibliographies, one of the more recent indexes should be used.

Henry L. Smith and William I. Painter, *Bibliography of Literature on Education in Countries other than the United States.* Bloomington, Ind.: Indiana University, School of Education, 1937. 341 pp.

An annotated bibliography of books and periodical material on foreign education from 1925–37.

Specialized indexes

A number of more specialized indexes are listed and briefly described.

Agricultural Index. New York: H. W. Wilson Co., 1916-date.

Issued monthly and cumulated annually and biennially. Covers periodicals, books, pamphlets, and official reports of the various state departments and the United States Department of Agriculture.

Art Index. New York: H. W. Wilson Co., 1930-date.

Issued quarterly with cumulation every three years. Covers over 150 selected magazines and museum publications in English and other languages. It also includes book reviews and exhibition information on the fine arts and related areas.

Business Education Index. New York: Business Education World, 1940-date.

Issued annually, it indexes articles by author and subject listing.

Music Index. Detroit: Information Service, Inc., 1949-date.

Issued monthly with annual cumulation. Covers over eighty periodicals. Indexes material on composers, compositions, reviews, obituaries, and performances.

Industrial Arts Index. New York: H. W. Wilson Co., 1913–58.

Issued monthly and cumulated annually. Covers over 200 periodicals. Indexes articles dealing with all phases of economic activity. Since January, 1958, this index has been replaced by two separate indexes: *Applied Science and Technology Index* and *Business Periodicals Index.*

Applied Science and Technology Index. New York: H. W. Wilson Co., 1958-date.

Formerly a part of *The Industrial Arts Index,* this index covers almost 200 periodicals in chemistry, physics, electricity, engineering, and industrial and mechanical arts.

Business Periodicals Index. New York: H. W. Wilson Co., 1958-date.

Formerly included in *The Industrial Arts Index,* this index covers over 100 periodicals in the fields of business, accounting, labor and management, marketing and purchasing, office management, public administration, banking and finance, taxation, insurance, and a variety of specific fields of business enterprise.

United Nations Document Index. New York: United Nations, 1950-date.

Issued monthly. All U. N. publications are listed by subject and issuing body.

Catholic Periodical Index. New York: Catholic Library Association, 1939-date.

Published quarterly with periodic cumulations, it indexes more than sixty Catholic periodicals, newspapers, and bulletins. The Catholic viewpoint is presented in many fields, including education.

New York Times Index. New York: 1913-date.

Published biweekly with annual cumulation. Classifies material in the New York *Times* alphabetically and chronologically under subject, title, person, and organization names. It is also useful in locating materials in other newspapers because it gives a clue to the date of events. Complete issues of the New York *Times* are available in microfilm form in many libraries.

Occupational Index. New York: Occupational Index, Inc., New York University, 1936-date.

Issued monthly with annual cumulation. Indexes more than 100 general and technical periodicals by subject, title, and author.

Gertrude Forrester, ed., *Occupational Literature.* New York: H. W. Wilson Co., 1958. 467 pp.

Lists more than 4400 selected references to books and pamphlets with annotations.

Patricia H. Suttles, ed., *Elementary Teachers Guide to Free Curriculum Materials.* Randolph, Wisc.: Educators Progress Service, 1944-date.

Lists helpful teaching materials, indexed by subject and title with descriptive notes.

Mary F. Horkheimer and John W. Diffor, eds., *Educator's Guide to Free Films.* Randolph, Wisc.: Educators Progress Service, 1941-date.

Issued annually, the 16th edition lists 3,453 films including 766 titles not previously listed. Indexed by subject and title and cross-indexed for convenient reference.

Mary F. Horkheimer and John W. Diffor, eds., *Educator's Guide to Free Slidefilms.* Randolph, Wisc., Educators Progress Service, 1949-date.

Issued annually, this publication lists slide films, indexed by subject and title, and cross indexed.

Walter A. Wittich and G. H. Halsted, eds., *Educators Guide to Free Tapes, Scripts and Transcriptions.* Randolph, Wisc.: Educators Progress Service, 1955-date.

Published annually and arranged by curricular areas with subject and title index; names and addresses of sources are indicated.

Educational Film Guide. New York: H. W. Wilson Co., 1948-date.

Issued monthly with annual cumulation. New motion picture films indexed by subject and title.

Filmstrip Guide. **New York: H. W. Wilson Co., 1948-date.**

Issued monthly with annual cumulation. Indexes latest releases of film strips and film slides.

Vertical File Service Catalogue. **New York: H. W. Wilson Co., 1932-date.**

Issued monthly, the catalogue indexes pamphlets and current free and inexpensive materials. Since these materials are soon out of print, the items should be ordered as soon after listing as possible.

Free and Inexpensive Learning Materials. **8th ed., Nashville: Division of Surveys and Field Services. George Peabody College for Teachers, 1957. 264 pp.**

ABSTRACTS

Another reference guide is the type known as the abstract, digest, or review. In addition to providing a systematized list of reference sources, it includes a summary of the contents of each article. Usually the summaries are brief, but in some publications they are presented in greater detail.

One of the most useful of these references in educational research is worthy of detailed description.

*** Review of Educational Research.** **Washington: American Educational Research Association (NEA), 1931-date.**

Published five times each year, the *Review* briefly summarizes research findings in education and related areas. The topics now appear in eleven major areas in three-year cycles, each issue bringing up to date the research developments of the previous three-year period. Since the classification of topics has been altered several times since the *Review* first appeared in 1931, the schedule of topics is not completely regular.

Graduate students in education will find this publication most valuable, particularly as a source of brief research summaries and an extensive bibliography of research, both published and unpublished. Since it is so comprehensive, a detailed schedule is presented:

1. Administration—Organization, Fiscal and Legal Aspects, School Plant and Management

I:3	June,	1931
II:2	April,	1932
II:5	Dec.,	1932
III:5	Dec.,	1933
IV:4	Oct.,	1934
V:2	April,	1935
V:4	Oct.,	1935
VII:4	Oct.,	1937
VIII:2	April,	1938
VIII:4	Oct.,	1938
X:4	Oct.,	1940
XI:2	April,	1941
XII:2	April,	1942
XIII:4	Oct.,	1943
XIV:2	April,	1944
XV:1	Feb.,	1945
XVI:4	Oct.,	1946
XVII:2	April,	1947
XVIII:1	Feb.,	1948
XIX:4	Oct.,	1949
XX:2	April,	1950
XXI:1	Feb.,	1951
XXII:4	Oct.,	1952
XXV:4	Oct.,	1955
XXVIII:4	Oct.,	1958

2. Curriculum—Supervision, Teaching

I:1	Jan.,	1931
IV:2	April,	1934
VII:2	April,	1937
XII:3	June,	1942
XV:3	June,	1945
XVIII:3	June,	1948
XXII:3	June,	1951
XXIV:3	June,	1954
XXVI:2	April,	1956
XXVII:3	June,	1957

3. Educational Measurement—Tests

II:3	June,	1932
II:4	Oct.,	1932
III:1	Feb.,	1933
V:3	June,	1935
V:5	Dec.,	1935
VIII:3	June,	1938
VIII:5	Dec.,	1938
XI:1	Feb.,	1941
XIV:1	Feb.,	1944
XVII:1	Feb.,	1947
XX:1	Feb.,	1950
XXIII:1	Feb.,	1953
XXVI:1	Feb.,	1956
XXIX:1	Feb.,	1959

4. Educational Psychology—Behavior, Learning, Teaching Methods

I:4	Oct.,	1931
I:5	Dec.,	1931
II:1	Feb.,	1932
III:4	Oct.,	1933
IV:5	Dec.,	1934
V:1	Feb.,	1935
VI:3	June,	1936
VII:5	Dec.,	1937
VIII:1	Feb.,	1938
IX:3	June,	1939
XVIII:6	Dec.,	1948

5. Educational Sociology—Social Foundations, History of Education, Comparative Education, Human Relations

VI:4	Oct.,	1936
VII:1	Feb.,	1937
IX:1	Oct.,	1939
X:1	Feb.,	1940
XII:1	Feb.,	1943
XVI:1	Feb.,	1946
XIX:1	Feb.,	1949
XXII:1	Feb.,	1952
XXIII:4	Oct.,	1953
XXV:1	Feb.,	1955
XXVIII:1	Feb.,	1958

6. Guidance—Counseling, Pupil Personnel

III:3	June,	1933
VI:2	April,	1936
IX:2	April,	1939
XII:1	Feb.,	1942
XV:2	April,	1945
XVIII:2	April,	1948
XXI:2	April,	1951
XXIV:2	April,	1954
XXVII:2	April,	1957

7. Mental and Physical Development

II:2 April, 1933
VI:1 Feb., 1936
IX:1 Feb., 1939
XI:1 Dec., 1941
XIV:5 Dec., 1944
XVII:5 Dec., 1947
XX:5 Dec., 1950
XXII:5 Dec., 1952
XXV:5 Dec., 1955
XXVI:5 Dec., 1956
XXVIII:5 Dec., 1958

8. Language Arts—Fine Arts, Natural Science, Mathematics, Social Studies

X:2 April, 1940
XI:4 Oct., 1941
XII:4 Oct., 1942
XIII:2 April, 1943
XV:4 Oct., 1945
XVI:2 April, 1946
XVIII:4 Oct., 1948
XIX:2 April, 1949
XXI:4 Oct., 1951
XXII:2 April, 1952
XXV:2 April, 1955
XXVIII:2 April, 1958

9. Research Methods—Statistics

IV:1 Feb., 1934
IX:5 Dec., 1939
XII:5 Dec., 1942
XV:5 Dec., 1945
XVIII:5 Dec., 1948
XXI:5 Dec., 1951
XXIV:5 Dec., 1954
XXVI:3 June, 1956
XXVII:5 Dec., 1957

10. Special Programs—Adult Education, Leisure Education, Citizenship Education

VI:5 Dec., 1936
X:5 Dec., 1940
XI:3 June, 1941
XI:4 Oct., 1941
XIII:5 Dec., 1943
XIV:3 June, 1944
XIV:4 Oct., 1944
XVI:5 Dec., 1946
XVII:3 June, 1947
XVII:4 Oct., 1947
XIX:5 Dec., 1949
XX:3 June, 1950
XX:4 Oct., 1950
XXIII:2 Spring, 1953
XXIII:3 June, 1953
XXIII:5 Dec., 1953
XXIV:1 Feb., 1954
XXIV:4 Oct., 1954
XXVI:4 Oct., 1956

11. Teacher Personnel

I:2 April, 1931
IV:3 June, 1934
VII:3 June, 1937
X:3 June, 1940
XII:3 June, 1943
XVI:3 June, 1946
XIX:3 June, 1949
XXII:3 June, 1952
XXV:3 June, 1955
XXVIII:3 June, 1958

*** *Oscar Buros, ed., Fourth Mental Measurements Yearbook.* Highland Park, N. J.: Gryphon Press, 1953. 1047 pp.**

This is the most complete and authoritative summary on psychological measurement and standardized tests. Contains reviews on 429 books on measurement and 758 excerpts from book reviews appearing in 121 professional journals. Almost 800 standardized tests and scales (achievement, aptitude, interest, and personality) are reviewed by one, two, or three reviewers.

Readers are urged to refer to previous editions of the yearbook, for material is not duplicated from one edition to the next.

1st edition 1938
2nd edition 1941
3rd edition 1949

*** *Book Review Digest.* New York: H. W. Wilson Co., 1905-date.**

Issued monthly and cumulated semiannually, annually, and every five years. Signed reviews of about 4,000 books each year are taken from more than seventy publications. Plus and minus signs are used to indicate degree of favor or disfavor expressed in the reviews. A complete directory of publishers and authors is included.

***Book List and Subscription Books Bulletin.* Chicago: American Library Association, 1955-date. (Formerly published as two separate periodicals, *Subscription Books Bulletin* and *Booklist*.)**

This reference presents an unbiased, critical analysis by expert librarians of atlases, encyclopedias, biographical works, dictionaries, and collections in terms of their usefulness and reliability for libraries or homes. It also lists all new books as they are released by publishers.

***Educational Abstracts.* Paris: Education Clearing House, UNESCO, 1949-date.**

Issued monthly, except July and August, this publication includes abstracts and articles on some specific phase of education in various countries of the world, such as adult education, textbooks, science teaching, research, visual aids, and rural education.

***Biological Abstracts.* Baltimore: Union of American Biological Societies, 1926-date.**

Indexes and abstracts published literature of research in biology as printed in all languages.

***Child Development Abstracts and Bibliography.* Washington: National Research Council, 1927-date.**

Issued bimonthly and cumulated annually. Abstracts over twenty journals.

***Chemical Abstracts.* Easton, Pa.: American Chemical Society, 1907-date.**

Issued semimonthly with annual indexes based on authors, subjects, formulas, and patent numbers. Cumulated every ten years.

An excellent guide to all articles on chemistry, carefully summarized.

Earl D. Graham and Marjorie M. Mullen, eds., *Rehabilitation Literature*. New York: McGraw-Hill Book Co., Inc., 1956. 573 pp.

Indexes and annotates 5,214 periodical articles, pamphlets, and books relating to the medical care, education, employment, welfare, and psychology of the handicapped.

*** *Psychological Abstracts*. Lancaster, Pa.: American Psychological Association, 1927-date.**

Issued monthly and indexed by subject and author annually. Excellent signed summaries of psychological research reports.

Paul Farnsworth, ed., *Annual Review of Psychology*. Palo Alto, Cal.: Stanford University.

Provides summaries of psychological literature.

***Education in Lay Magazines*. Washington: Research Division, NEA, 1948-date.**

Issued four times each year. Contains a digest of articles on education published in nonprofessional magazines.

***Summary of Doctoral Dissertations*, 14th ed. Madison, Wisc.: University of Wisconsin, 1958.**

This volume, published biennially, contains abstracts of all dissertations accepted in partial fulfillment of requirements for the doctor's degree at the University, and makes available to students everywhere the reports of doctoral research. It is cited to illustrate the type of publication issued by nearly all institutions granting the doctoral degree.

ENCYCLOPEDIAS

Encyclopedias provide concise articles on a number of subjects. Written by specialists, they provide a convenient source of information with a minimum of searching. In addition they often include illustrations, maps, diagrams, and bibliographies.

General encyclopedias cover practically all topics. A number of excellent specialized encyclopedias present more detailed material in restricted areas of knowledge. Both general and educational encyclopedias are described in this section.

*** *Encyclopaedia Britannica*, 14th ed. Chicago: Encyclopaedia Britannica Corp., 1949, 24 volumes.**

The most famous and complete encyclopedia in the English language. Most of the important articles are signed. Volume 24 contains a comprehensive detailed index, which should be used to be sure that all pertinent information is found. The *Britannica Book* (1931-date) *of the Year*, published annually as a supplement, covers events of the preceding year and brings the encyclopedia up to date.

*** *Encyclopedia Americana*. New York: Americana Corporation, 33 volumes.**

A fine general encyclopedia with especially good information on American places, persons, organizations, and institutions. The articles are usually shorter than those in the *Britannica*. Continuous revision keeps it reasonably up to date. The *Americana Annual* is published each year as a supplement to cover events of the preceding year.

***Collier's Encyclopedia*. New York: P. F. Collier and Son, 1954, 20 volumes.**

An excellent illustrated encyclopedia. Volume 20 contains a graded bibliography in many subject areas. An annual supplement is published each year.

*** *Columbia Encyclopedia in One Volume*. New York: Columbia University Press, 1953. 2203 pp.**

A handy, one-volume, up-to-date, quick desk reference. It contains over 70,000 articles, which are necessarily short. There are no illustrations.

Lincoln Library of Essential Information, 22nd ed. Buffalo: Frontier Press, 1955.

This one- or two-volume encyclopedia is a concise general reference, although not as complete as a standard general encyclopedia.

World Book Encyclopedia. Chicago: Field Enterprises, 1955, 19 volumes.

An excellent juvenile encyclopedia written authentically in clear style. This work is also helpful to adults who want brief articles.

American Yearbook. New York: Thomas Nelson and Sons (publisher varies), 1910–19, 1925-date.

Contains accounts of events of the year in various fields such as politics, economics, social affairs, and the arts. Carefully indexed, making fact-searching convenient.

Facts on File. New York: Facts on File, Inc., 1940-date.

An eight-page, weekly, current encyclopedia. Covers world news indexed for quick fact-finding. Thousands of newspapers and press releases and hundreds of periodicals are searched for information. The advisory board is composed of distinguished scholars in each field. Indexes are cumulated monthly, quarterly, and annually.

Encyclopedia of the Social Sciences. New York: The Macmillan Co., 1930–35. 15 volumes.

Prepared under the direction of ten learned societies that are international in scope. Treats topics in all of the social sciences, including anthropology, economics, education, ethics, geography, history, law, philosophy, political science, psychology, social work, sociolgy, and statistics. Excellent biographies of important social scientists, and skillful historical treatment of many topics.

*** Walter S. Monroe, ed., _Encyclopedia of Educational Research_. American Educational Research Association. New York: The Macmillan Co., 1950. 1520 pp.**

Cites outstanding research on educational problems. Each article is written by a specialist, and an excellent bibliography follows each article. A new edition, scheduled for publication in 1960, will include reports of educational research conducted and published in foreign countries as well as in the United States.

Paul Monroe, ed., *Cyclopedia of Education*. New York: The Macmillan Co., 1911–13. 5 volumes.

Old but useful reference in covering basic information, particularly of a historical or biographical nature in education. It covers all countries and all periods.

Henry D. Rivlin and H. Schueller, eds., *Encyclopedia of Modern Education*. New York: Philosophical Library, 1943. 902 pp.

A concise, nontechnical treatment of basic educational topics. It is useful for lay readers, or to supplement the *Cyclopedia of Education* mentioned above.

I. L. Kandel, ed., *Educational Yearbook of the International Institute of Teachers College*. New York: Bureau of Publications, Columbia University, 1928–44. 20 volumes.

An excellent reference for comparative education, describing various national systems of education. Most volumes are devoted to some particular aspect of education, such as adult education, rural education, etc.

J. A. Lauwerys and others, eds., *Yearbook of Education*. New York: World Book Co., 1953-date.

This yearbook is prepared under the joint responsibility of the University of London Institute of Education and Teachers College of Columbia University. Each issue is devoted to some aspect of education, which is described at length by more than fifty eminently qualified persons representing various countries.

Each year a different aspect of education is treated.

1953	Status and Position of Teachers
1954	Educational and Technological Development
1955	Educational Counseling
1956	Education and Economics

1957 Education and Philosophy
1958 The Secondary School Curriculum

G. B. Jeffery, ed., *Yearbook of Education.* University of London, Institute of Education. London: Evans Bros., Ltd., 1932–40, 1948-date.

This yearbook is not to be confused with the one mentioned above. This yearbook contains signed articles on all phases of educational development in all English-speaking and major European countries.

***International Yearbook of Education.* Geneva, Switzerland: International Bureau of Education, UNESCO, 1948-date.**

Presents a review of educational developments for the previous year in the United States, Canada, and forty-three foreign countries.

Lloyd E. Blauch, ed., *Education for the Professions.* Washington: U. S. Dept. of Health, Education and Welfare, 1955. 317 pp.

A comprehensive treatment of professional education in the United States, covering every field from agriculture to veterinary medicine. The strengths and weakness of each program are analyzed. Contains descriptions of schools, accrediting associations, degree requirements, curricula, and current problems in each area. Excellent bibliography.

Ralph B. Winn, ed., *Encyclopedia of Child Guidance.* New York: Philosophical Library, 1943. 456 pp.

Articles initialed by writers who can be identified under list of contributors.

Oscar J. Kaplan, ed., *Encyclopedia of Vocational Guidance.* New York: Philosophical Library, 1948. 2 volumes.

Designed for professional counselors, but does not cover all phases of guidance in detail. Analysis of a number of standardized tests included.

Eric Blom, ed., *Grove's Dictionary of Music and Musicians,* 5th ed. New York: The Macmillan Co., 1940. 6 volumes.

This is actually a musical encyclopedia. Over 500 contributors, in signed articles, write on music terminology, history, theory, composers and compositions, instruments, and artists.

ALMANACS, YEARBOOKS, DIRECTORIES, AND HANDBOOKS

This general classification of references includes the types of publications that supplement encyclopedias. The emphasis is upon a great number of current detailed facts, rather than on written articles of a background nature. They supply concise factual information of a statistical or identifying nature. One turns to a reference of this kind for a specific item of information, such as the enrollment of the University of Wisconsin. The information is conveniently classified and readily available.

The more general sources are presented first, followed by those dealing with more specialized areas of information.

*** *World Almanac—Book of Facts.* New York: World Telegram Corp., 1868-date.**

Published annually, this inexpensive volume is the most comprehensive and most frequently used source of miscellaneous information. Statistical data in social, political, religious, sports, educational, and economic affairs are presented. A chronology of important events of the previous year is included. An alphabetical index is found in the front of each volume.

*** John Kieran, ed., *Information Please Almanac.* New York: The Macmillan Co. (publisher varies), 1933-date.**

This general almanac is similar to the *World Almanac,* but contains some information not found there. The index is found at the back of each volume.

*** *Statistical Abstract of the United States.* Washington: Department of Commerce, Supt. of Documents, U. S. Gov't. Printing Office, 1897-date.**

This important volume includes statistical data collected by all agencies of the government, as well as some collected by private agencies. It covers statistical data on all topics. Of interest to students in education is the data on students, institutions, enrollment, salaries, expenditures, and literacy. All levels, from preschool to higher education, are covered.

Statesman's Yearbook. New York: The Macmillan Co., 1864-date.

A compilation of important data about the various governments of the world. All areas of governmental activity are covered. Authentic educational information is included.

Book of the States. Chicago: Council of State Governments, 1935-date.

Published every other year, this publication presents statistical data on each of the forty-eight states. Names of chief officials and numerous facts are included.

*** _Biennial Survey of Education in the United States._ Washington: Dept. of Health, Education and Welfare. U. S. Gov't. Printing Office, 1916-date.**

This official publication presents detailed statistical information on all phases of education in the United States.

Yearbook of the United Nations. New York: United Nations, Columbia University Press, 1946-date.

Summarizes the activities of the various agencies of the United Nations.

Schoolman's Almanac. New York: Educator's Washington Dispatch, 1947-date.

Summarizes educational events of the previous year, presents calendar of events of current year, and summarizes significant educational trends and developments. A valuable source of miscellaneous current information about education in America.

*** Robert C. Woellner and M. Aurilla Wood, eds., _Requirements for Certification of Teachers, Counselors, Librarians and Administrators in Elementary and Secondary Schools and Junior Colleges,_ 23rd ed. Chicago: The University of Chicago Press, 1958–59. 131 pp.**

The title describes the purpose of the volume, which presents data for each of the forty-eight states and the territories.

A Manual on Certification Requirements for School Personnel in the United States. Washington: Dept. of Health, Education and Welfare. U. S. Gov't. Printing Office, 1957. 232 pp.

Certification practices of the forty-eight states and territories. Less specific than the Woellner-Wood volume.

Handbook on Teacher Education, Bulletin #192. Indianapolis: State of Indiana, Division of Teacher Training and Licensing, Department of Public Instruction, 1954. 96 pp.

A complete guide to teacher education and teaching requirements in Indiana as established by law and rules of the Department. (Other states have comparable publications.)

Eileen C. Graves, ed., *Ulrich's Periodicals Directory*, 8th ed. New York: R. R. Bowker Co., 1956. 730 pp.

A classified list of over 9,000 foreign and domestic periodicals. Periodicals are arranged alphabetically by subject and title. Name and address of publisher and subscription price are listed.

America's Educational Press Yearbook. Washington: Educational Press Association, 1926-date.

A classified list of periodicals published in the United States that deal primarily with education. Names of periodicals are indexed alphabetically and grouped by subject areas. Names of editors, addresses of publishers, number of issues per year, and subscription prices are given.

Union List of Serials in Libraries of the United States and Canada. New York: H. W. Wilson Co., 1927.

A listing of the periodicals, foreign and domestic, held by over 225 United States and Canadian libraries. This listing does not include government publications or other highly specialized materials.

* Leona H. May, ed., *Patterson's American Educatior.* Chicago: Educational Directories, Inc., 1904-date. Vol. 54, 1957–58. 651 pp.

Lists, by states, school officials for practically all schools and school systems in the country, both private and public. Schools are listed alphabetically, with names of superintendents, directors, principals, supervisors, librarians, and business officials.

* *Educational Directory.* U. S. Office of Education. Washington: U. S. Gov't. Printing Office, 1912-date.

Revised annually, this directory, issued in four separate parts, includes the following data:

1. Principal state school officers.
2. County and city school officers (over 2500 population).
3. Colleges, universities, and junior colleges, with their principal officers.
4. Educational associations and their officers.

Jesse P. Bogue, ed., *American Junior Colleges,* 4th ed. Washington: American Council on Education, 1956. 537 pp.

Complete data on junior colleges, both private and public.

Mary Irwin, ed., *American Universities and Colleges,* 7th ed. Washington: American Council on Education, 1956. 1054 pp.

Published every four years, this standard reference work on higher education gives detailed information on 969 institutions. It includes information on admission, method of control, degree requirements, tuition and fees, departments, staff, enrollment, library, housing, foreign students, accreditation, graduate work, and military programs.

Clarence E. Lovejoy, ed., *Lovejoy's Complete Guide to American Colleges and Universities,* 4th rev. ed. New York: Simon and Schuster, 1956/57. 266 pp.

This work is directed towards the prospective college student and includes information useful in choosing a school.

Frederick W. Ness, ed., *A Guide to Graduate Study: Programs Leading to the Ph.D. Degree.* Washington: Association of American Colleges, 1957. 335 pp.

A useful reference to assist undergraduates in planning for graduate study, providing a basis for the selection of a graduate institution.

Study Abroad, International Handbook. Paris: UNESCO, 1955. 308 pp.

A comprehensive directory and guide giving detailed information on fellowships and awards for foreign study. Funds, foundation activities, school requirements, and teacher exchange information is included.

M. M. Chambers, ed., *Universities of the World Outside the United States.* Washington: American Council on Education, 1950. 924 pp.

Includes information on over 2,000 institutions of higher learning in more than seventy countries. It includes information on name, location, history, admission, degree requirements, language of instruction, grading system, staff enrollment, foreign students, buildings and campus, finances, and administrative officers.

Martena T. Sasnett, *Educational Systems of the World: Interpretation for Use in Evaluation of Foreign Credentials.* Los Angeles: University of Southern California Press, 1952. 888 pp.

An especially useful reference for college registrars for setting up American equivalencies for study done abroad.

Raymond J. Young, ed., *Directory of Educational Research Agencies and Studies.* Bloomington, Ind.: Phi Delta Kappa, 1957. 80 pp.

This work lists hundreds of educational research agencies, individuals in charge of the agencies, types of research carried on, and listing of topics.

NEA Handbook for Local, State and National Associations. Washington: NEA, 1945/46-date.

Contains comprehensive reports and listings of state and national officers of the NEA and affiliated departments and associations. This includes information on state teachers' associations and on the World Confederation of Organizations of the Teaching Profession.

Mary L. Ely, ed., *Handbook of Adult Education in the United States.* New York: Institute of Adult Education, Teachers College, Columbia University, 1948. 555 pp.

Contains signed articles of the survey type dealing with various aspects of adult education.

Negro Handbook. New York: Current Reference Publications, 1942-date.

Compiles a great deal of data on events of the previous year as related to the Negro and his welfare. It includes such topics as crime, population trends, publications, sports, civil rights, religious affairs, and educational and welfare activities.

Morris Fine, ed., *American Jewish Yearbook,* American Jewish Committee. Philadelphia: Jewish Publishing Society of America, 1899-date.

A comprehensive statistical reference on all phases of Jewish life throughout the world.

American Foundations and Their Fields. New York: American Foundation Information Service, 1955. 744 pp.

Includes such information as names and addresses of foundations, officers, history, purposes, donors, activities, assets, and expenditures.

Encyclopedia of American Associations. Detroit: Gale Research Co., 1956. Supplements I and II, 1957. 401 pp.

A directory of national associations of national scope, including business, scientific, educational, health, social welfare, and others of a more general nature. Alphabetical listing of associations includes information on membership, address, name of executive secretary, and a short statement of purpose.

George S. Lasher, ed., *Baird's Manual of American College Fraternities.* Menasha, Wisc.: George Banta Co., 1957. 1084 pp.

Includes detailed information on professional and social fraternities, sororities, and honor societies.

Ann J. Richter, ed., *American Library Directory*. New York: R. R. Bowker Co., 1951. 844 pp.

A comprehensive guide to public, private, institutional and collegiate libraries in the United States and Canada. Arranged alphabetically by states and cities, it includes such information as number of volumes, special collections, salaries of staff, budgets, and affiliation.

***Administrative Handbook for the Schools of Indiana*. Indianapolis: State of Indiana, Department of Public Instruction, 1958. 380 pp.**

A guide to the duties and responsibilities of school administrators and board members. (Other states have comparable handbooks.)

***Handbook of the Indiana High School Athletic Association*. Indianapolis: IHSAA, 1904-date. 262 pp.**

Published annually, this handbook describes the functions of the association, the minutes of the Board of Control, and the records of high school teams in interscholastic competition. (Most states have a comparable publication.)

***Butler University Bulletin*. Indianapolis, Indiana, 1854-date.**

A college catalogue yields a great deal of information about an institution, its history, courses of study, admission requirements, degrees granted, campus, buildings, tuition and fees, enrollment, and staff. This is often the best source of information about a particular school, containing much more detailed information than is found in any of the general references.

Most colleges and universities maintain a rather complete file of the catalogues of other institutions, either in the library or in the Admissions Office.

BIOGRAPHICAL REFERENCES

Educational workers often find that they need information about another educator or a prominent person outside the field of education. Some of these occasions relate to the problems of educational research, while others concern professional contact of one kind or another.

A partial list of situations in which detailed information of a biographical nature would be helpful is:

1. To help evaluate writings. Who is the author of a textbook, article, or report? Is he a recognized authority? What is his experiential background?
2. To recommend a speaker for a professional meeting.
3. To prepare a press release about an outside speaker.
4. To introduce a visiting speaker.
5. To prepare for an important interview.
6. To correspond with a person with greater understanding of his background.
7. To choose an authority with whom to work professionally. This may involve the choice of a major professor for advanced study.
8. To aid in recommending an individual for an honor, such as an award or an honorary degree.

Fortunately, there are a number of sources of information about the famous and the not-so-famous. If the person is really outstanding, a general reference will supply the needed information. If he is not so prominent, a specialized source must be consulted.

Before listing a number of recognized sources of biographical data, a word of caution may be advisable. Many of the hundreds of these current biographical references have been criticized as vanity publications, including in their listings persons of little distinction who are anxious to get their names in the publication. Another criticism concerns the possible lack of validity of some of the information. Since persons listed usually send in their own data (which is not always carefully checked), some inaccuracies may result. Another criticism, that important personalities are not listed, is sometimes true, for the listings are usually submitted as the result of an invitation by the publisher.

Without questioning the motives of the publishers, who finance their publication by fees from those listed, the reader is urged to evaluate the biographical data carefully. These publications, in spite of their limitations, provide a reasonably useful source of biographical information.

Included in the sketches are rather detailed bits of information, such as present position and title, date and place of birth, names of parents, college degrees, name of spouse, name of spouse's parents, names of children, positions previously held (listed chronologically), honorary positions, membership in organizations, title of doctoral dissertation, books published, contributions to periodicals, military experience, travel, and hobbies.

Limited information on educators not listed in one of these references may be found in the catalogue of the college or university where the person teaches.

*** *Current Biography.* New York: H. W. Wilson Co., 1940-date.**

Issued monthly and cumulated yearly, this reference covers celebrities: kings, prime ministers, presidents, Nobel prize winners, senators, cabinet members, Supreme Court justices, and radio, film, television, and stage personalities. The yearly cumulation is entitled *Current Biography Yearbook.*

*** *Who's Who in America Current Biographical Reference Service.* Chicago: Marquis Co., 1940-date.**

This monthly publication, by the publisher of *Who's Who in America,* covers individuals of all countries. It does not duplicate the names listed in *Current Biography.*

***Biography Index.* New York: H. W. Wilson Co., 1946-date.**

A quarterly index of biographical material found in more than 1300 periodicals and in the various indexes of the H. W. Wilson Company. Articles are indexed by name, profession, and occupation.

***Webster's Biographical Dictionary.* Springfield, Mass.: G. & C. Merriam Co., 1943.**

Contains over 40,000 brief biographical sketches, from a few lines to more than a page in length. It is useful for identifying persons of any nationality from any period of history. Proper pronunciation of names is indicated. It includes some living persons.

Dictionary of American Biography. New York: Charles Scribner's Sons, 1928–36. 20 volumes.

This biographical reference, written by recognized authorities, contains information on more than 15,000 men and women; prepared under the direction of the American Council of Learned Societies.

* *Who's Who in America.* Chicago: Marquis Co., 1899-date.

Published every other year, this general reference is considered one of the most reliable.

Who Was Who in America. Chicago: Marquis Co., Vol. I, 1897–1942; Vol. II, 1943–50.

These references list deceased persons who were prominent. Encyclopedias also give information about famous deceased persons.

American Men of Science. Lancaster, Pa.: Science Press, 1949.

Vol. I	1955	Physical Sciences
Vol. II	1955	Biological Sciences
Vol. III	1956	Behavioral Sciences

* J. Cattell and E. E. Ross, eds., *Leaders in Education.* Lancaster, Pa.: Science Press, 1948-date.

Contains data on more than 17,000 American educators.

* Robert C. Cook, ed., *Who's Who in American Education.* Nashville, Tennessee: Who's Who in American Education, Inc., 1928-date.

Published biennially, this publication lists some less-than-prominent, as well as prominent, educators.

Robert C. Cook, ed., *Trustees and Presidents of American Colleges and Universities.* Nashville, Tenn.: Who's Who in American Education, 1955-date.

Formerly published as Presidents and Professors in American Colleges and Universities. Includes data on officials of 1462 out of 1857 institutions, indexed by state and by institution.

DICTIONARIES

Students in education need to know the precise meaning of words in order to read with understanding and to write clearly and succinctly. The large unabridged dictionaries are recommended for their completeness and presentation of exact meanings. For acceptable definitions of technical terms used in education, psychology, or sociology, specialized dictionaries are most helpful.

* *Webster's New International Dictionary of the English Language,* 2nd ed., unabridged. Springfield, Mass.: G. & C. Merriam Co., 1957. 3214 pp.

Contains over 600,000 words, including a historical development of the meaning of words. Also included are antonyms, synonyms, symbols and abbreviations, and pronouncing guides to geographical and biographical names.

Oxford English Dictionary. Oxford: Clarendon Press, 1933. 12 volumes and supplements, 1933.

Includes about 415,000 words, with complete origin of every word in the language, excluding only words obsolete by 1150 and some slang.

Funk and Wagnall's New Standard Dictionary of the English Language. New York: Funk and Wagnalls Co., 1950. 2895 pp.

Another fine unabridged dictionary.

* *Roget's Thesaurus of Words and Phrases.* New York: Grosset and Dunlap, Inc., 1947.

A thesaurus is the opposite of a dictionary. When you have an idea, you look for the most appropriate word to convey that idea. Synonyms, antonyms, and words frequently associated are listed together.

J. I. Rodale, *The Word Finder*. Emmaus, Pa.: Rodale Press, 1947. 1317 pp.

A valuable writing guide that provides the right adjective, verb, or adverb to remedy sluggish sentences, and to embellish ideas.

* Carter V. Good, ed., *Dictionary of Education*. New York: McGraw-Hill Book Co., Inc., 1959.

This fine educational dictionary covers 17,000 technical and professional terms, including related terms from the fields of sociology, philosophy, psychology, and social psychology. Foreign educational terms used in comparative education writings are included.

Horace B. English and Ava C. English, *Comprehensive Dictionary of Psychological and Psychoanalytical Terms*. New York: Longmans, Green & Co., Inc., 1958. 534 pp.

Over 13,000 terms are included in this specialized dictionary, defined in nontechnical language.

Henry P. Fairchild, ed., *Dictionary of Sociology*. New York: Philosophical Library, 1944. 342 pp.

Curtis A. Bartholomew, ed., *Epithetology*. Red Bank, N. J.: Commercial Press, 1948. 207 pp.

A complete guide to recognized educational degrees, both earned and honorary. A historical presentation of academic degrees is included.

* *Dictionary of Occupational Titles*, 2nd ed. Washington: U. S. Dept. of Labor Employment Service, U. S. Gov't. Printing Office, 1949. 1518 pp.

Lists 39,000 job titles and 25,000 job descriptions. Useful in vocational counseling and in the study of occupations and industrial processes.

QUOTATION SOURCES

The use of an appropriate quotation often adds to the effectiveness of a speech or written report. The writer once heard a speaker, commenting on the dangers of overspecialization in the graduate program, paraphrase the words of Nicholas Murray Butler, late president of Columbia University, who defined a specialist as one who learns more and more about less and less until he knows everything about nothing. The memory of this interesting quotation has remained, long after the speaker and the speech had been forgotten.

In using quotations it is important to insure their accuracy and to give credit to the author. If it seems to add effectiveness to paraphrase or alter the quotation for specific application, that fact should be acknowledged.

Most libraries have a number of references that provide useful quotations and their sources. They are usually indexed by subject, author, or first line. It has been suggested that educators build their own file of useful quotations, listing them on file cards placed under appropriate subject headings.

***John Bartlett, *Familiar Quotations*, 13th ed. Boston: Little, Brown & Co., 1955. 1614 pp.**

An old standard reference that has been revised and brought up to date many times. Quotations are arranged chronologically by authors. An excellent index makes it possible to find a quotation when only a word or two is remembered.

Sir Paul Harvey, *Oxford Companion to Classical Literature*. Oxford: Clarendon Press, 1937.

An excellent guide to classical allusions in everyday use.

Jehiel H. Hoyt, *Hoyt's New Cyclopedia of Practical Quotations*, Kate L. Roberts, ed. New York: Funk and Wagnalls Co., 1940. 1343 pp.

Another old reference, frequently revised. Indexed by subject and author.

Burton Stevenson, *Home Book of Quotations, Classical and Modern*, 5th ed. New York: Dodd Mead & Co., 1947. 2812 pp.

Includes over 50,000 extracts from all ages and parts of the world. Indexed by subject and author.

ATLASES AND GAZETTEERS

Reading professional literature with understanding and preparing reports effectively may depend upon reference to good, up-to-date maps. Excellent atlases, or collections of maps, and gazetteers, or geographical dictionaries, are available in most libraries. Since political boundaries change frequently in our modern world, it is important to use as recent revisions of these publications as possible.

Rand McNally Commercial Atlas and Marketing Guide. New York: Rand McNally & Co., 1876-date.

An excellent large atlas with particular emphasis upon the United States. Revised annually, the atlas must be returned to the publisher for replacement.

* *Rand McNally Cosmopolitan World Atlas*. New York: Rand McNally & Co., 1949. 335 pp.

A smaller but adequate atlas, with emphasis upon world geography.

The following atlases are also useful:

Cram's Unrivaled Atlas. Indianapolis: George F. Cram Co., 1952. 400 pp.

Hammond's Complete World Atlas. New York: Hammond Co., 1950. 375 pp.

John Millett, ed., *Atlas of Higher Education in the United States*. New York: Commission on the Financing of Higher Education, Columbia University Press, 1952. 57 pp.

Contains outline maps showing the location of collegiate institutions, and includes higher education statistics by states.

GOVERNMENT PUBLICATIONS

An excellent source of educational information is the great number of publications of the various agencies of the federal government. The publications consist of bulletins, leaflets and circulars, directories and handbooks, statistical reports, bibliographies, and research studies.

Several guides are especially helpful in locating these references.

*** Ann M. Boyd, *United States Government Publications*. New York: H. W. Wilson Co., 1949. 627 pp.**

An excellent compilation of government documents of all kinds. Included is information on United States depositories in state and territorial libraries, service academies, and land-grant colleges. These depositories maintain a complete file of recent government documents. Older documents will probably be found in older depository libraries.

Herbert S. Hirshberg and Carl H. Melinat, *Subject Guide to United States Government Publications*. Chicago: American Library Association, 1947. 228 pp.

This reference lists the most important government publications under alphabetical topic listings, with short descriptive notes for many of the items.

W. Phillip Leidy, *A Popular Guide to Government Publications*. New York: Columbia University Press, 1953. 296 pp.

This excellent reference gives an annotated bibliography on government documents and instructions on their use. Quasi-government agency publications such as those of the Pan-American Union are listed.

United States Department of Health, Education and Welfare, Office of Education. *Publications Relating to Education*. Price List #31. Washington: Superintendent of Documents, U. S. Gov't. Printing Office.

This publication, free upon request, lists documents alphabetically by subject, with brief annotation, price, and order blank.

SCHOOL LAW REFERENCES

All professional workers should have some familiarity with the legal aspects of education. Many graduate students, particularly those specializing in the field of educational administration, will need to know where to find the legal principles surrounding the work of the school board, the administrator, and the teacher. This may involve actually studying the laws and court decisions in which the laws are interpreted.

Legal encyclopedias

* William Mack and Donald J. Kiser, eds., *Corpus Juris Secundum*, Vols. 78 and 79. New York: American Law Book Co., 1937.

This work has replaced the older volume Corpus Juris, Vol. 56, for so long a standard statement of American School Law. (See Topic, Schools). Annual pocket supplements are available.

* *American Jurisprudence.* Rochester, N. Y.: Lawyer's Cooperative Publishing Co., 1936.

This series has replaced the older series *Ruling Case Law*. (See Topic, Schools, Vol. 47.)

Indexes

Index to Legal Periodicals and Law Library Journal. New York: H. W. Wilson Co., 1908-date.

Current coverage of over 100 legal periodicals.

State Law Index. Washington: Library of Congress, 1929-date.

Abstracts

R. R. Hamilton, ed., *National School Law Reporter.* New London, Conn.: Arthur C. Croft, March 1955-date.

Formerly known as *Bi-Weekly School Law Letter* (1951–55).

A biweekly, loose-leaf publication, discussing school law cases with excerpts from court decisions. Concise summary by editor is included. Indexed.

School Teacher's Day in Court. Washington: Research Division, NEA, 1950-date.

Issued annually, deals with problems involving teachers. Contains statistical analysis and abstracts of court cases of previous year.

Pupil's Day in Court. Washington: Research Division, NEA, 1950-date.

Deals with cases directly concerned with public school pupils.

High Spots in State School Legislation. Washington: Research Division, NEA, 1949-date.

An annual summary of significant school law cases.

Textbooks on school law

Newton Edwards, *The Courts and the Public Schools*, rev. ed. Chicago: The University of Chicago Press, 1955. 594 pp.

Lee O. Garber, *Handbook of School Law.* New London, Conn.: Arthur C. Croft. 165 pp.

The legal status of school problems is indexed for handy reference. Uses the question-answer method of presentation.

Lee Garber, ed., *Law and the School Business Manager.* Danville, Ill.: Interstate Printers and Publishers Inc., 1957. 331 pp.

Robert R. Hamilton, *Legal Rights and Liabilities of Teachers.* Laramie, Wyo.: School Law Publications, 1956. 95 pp.

A nontechnical presentation of school law and court decisions affecting school problems.

Robert R. Hamilton and Paul Mort, *The Law and Public Education, With Cases.* Chicago: Foundation Press Inc., 1944. 579 pp.

Robert R. Hamilton and E. E. Reutter, *Legal Aspects of School Board Operation.* New York: Bureau of Publications, Teachers College, Columbia University, 1958. 199 pp.

Wendell Huston, *School Laws of the 48 States.* Seatile: Wendell Huston Co., 1947.

Loose-leaf publication with federal and state supplements.

School Law of Indiana. Indianapolis: State of Indiana, Department of Public Instruction, 1949. Cumulative pocket supplement biennially.

A complete summary of statutes, court decisions and opinions of the State Attorney General. Most states have a comparable publication.

Pauli Murray, *State Laws on Race and Color.* Cincinnati: Woman's Division of Christian Service, Board of Missions and Church Extension of the Methodist Church, 1950. 746 pp.

Discusses laws dealing with segregation and discrimination in areas of education, housing, transportation, and employment.

Madeline K. Remmlein, *School Law.* New York: McGraw-Hill Book Co., Inc., 1950. 376 pp.

Presents legal problems of teacher and pupil personnel; includes extracts from statutory and case materials.

Madeline K. Remmlein, *The Law of Local Public School Administration.* New York: McGraw-Hill Book Co., Inc., 1953. 271 pp.

Discusses legal problems that confront school administrators; includes important court decisions.

Harry R. Trusler, *Essentials of School Law.* Milwaukee: Bruce Publishing Co., 1927. 478 pp.

An old but still useful reference on legal principles.

J. F. Weltzin, *The Legal Authority of the American Public School.* Grand Forks, N. D.: Mid-West Book Concern, 1931. 286 pp.

A study of liabilities to damages.

Yearbooks

M. M. Chambers, ed., *Yearbook of School Law.* American Council on Education, 1933–42.

Digests of court decisions affecting schools, as well as feature articles on legal principles.

*** Leo O. Garber, ed., *Yearbook of School Law*. Philadelphia: University of Pennsylvania. 1950-date.**

Continues the yearbook cited above.

Advanced legal research

The advanced student of legal research may need to consult primary references. In addition to the general statutes published by each state and kept up to date by cumulative supplements or pocket reports, a number of other sources are available.

***American Digest System*. St. Paul, Minn.: West Publishing Company.**

A digest of all law cases from 1658 to the present, published under seven series units, with cases classified by topic and subtopic, state, name, and source. Key numbers are also provided for cross reference purposes.

Century Digest			1658–1896
First	Decennial	Digest	1896–1906
Second	"	"	1906–1916
Third	"	"	1916–1926
Four	"	"	1926–1936
Fifth	"	"	1936–1946
General Digest			1946–

For a complete analysis of the written decisions of the court, the National Reporter System may be used.

***National Reporter System*. St. Paul, Minn.: West Publishing Company.**

Published several times per year, these volumes include all cases from all courts in all states, giving the actual written opinion of the court. The system is divided into regional reporters, covering geographical areas.

***Atlantic Reporter*, 1886-date. Covers Connecticut, Delaware, Maine, Maryland, New Hampshire, New Jersey, Pennsylvania, and Vermont.**

Northeastern Reporter, 1885-date. Covers Illinois, Indiana, Massachusetts, Ohio, New York, and Rhode Island.

Southeastern Reporter, 1887-date. Covers Georgia, North Carolina, South Carolina, Virginia, and West Virginia.

Southern Reporter, 1887-date. Covers Alabama, Florida, Louisiana, and Mississippi.

Southwestern Reporter, 1887-date. Covers Arkansas, Kentucky, Missouri, Tennessee, and Texas.

Pacific Reporter, 1884-date. Covers Arizona, California, Colorado, Idaho, Kansas, Montana, Nevada, New Mexico, Oklahoma, Oregon, Utah, Washington, and Wyoming.

Northwestern Reporter, 1879-date. Covers Iowa, Michigan, Minnesota, Nebraska, North Dakota, South Dakota, and Wisconsin.

New York Supplement, 1888-date.

Federal Reporter, 1880-date.

This series reports cases decided in the federal circuit court of appeals, federal district court, and other federal courts.

Supreme Court Reporter, 1882-date.

This series reports decisions of the United States Supreme Court since 1882. Earlier reports of the court were issued under the names of various court reporters.

American Law Reports, Annotated. Rochester, N. Y.: Lawyers Cooperative Publishing Company, 1919–48.

A series of selected cases dealing with controversial opinion, covering both state and federal courts. The volumes are issued serially, year by year. A second series was started in 1948.

Shephard's Citations to Statutes. Colorado Springs, Colo.: The Frank Shephard Company.

A periodical that cites all subsequent court applications, citations, interpretations, or revisions of any and all laws. Cases are published by states and by geographic divisions of the National Reporter System.

PERIODICAL SOURCES OF RESEARCH REPORTS

While many periodicals include an occasional research report, a limited number devote a major portion of space to direct reports of scholarly research studies in education and in closely related areas.

Educational and Psychological Measurement
Journal of Educational Research
Journal of Experimental Education
Research Bulletins of the National Educational Assn.
Phi Delta Kappan
Journal of Educational Psychology
Journal of Educational Sociology
Journal of Psychology
Journal of Social Psychology
Research Quarterly of the American Association for Health, Physical Education and Recreation
Bulletin of the National Association of Secondary School Principals
Educational Administration and Supervision
Journal of Negro Education
Educational Research Bulletin (Ohio State University)
National Business Education Quarterly
State Teachers Association Research Reports
State Department of Public Instruction Research Reports

Quarterlies, reports, and yearbooks of national associations are an important part of the literature of education. Many of these publications are devoted to a single topic. A recent issue usually lists the topics covered in previous issues.

Graduate students should investigate the publications of these professional societies and associations:

American Association for Health, Physical Education and Recreation
American Association of Colleges for Teacher Education
American Association of School Administrators
American Council on Education
Association for Supervision and Curriculum Development
Association for Higher Education
Association for Student Teaching
Department of Rural Education of the NEA
Educational Policies Commission

Elementary School Principals
Fund for the Advancement of Education (Ford Foundation)
National Art Education Association
National Association of Secondary School Principals
National Council on Teacher Education and Professional Standards
National Council for the Social Studies
National Council of Teachers of Mathematics
National Society for the Study of Education
Speech Association of America
World Confederation of Organizations of the Teaching Profession
State Departments of Public Instruction
State Teachers Associations

NOTE-TAKING

One of the most important research activities of the graduate student is note-taking, putting materials in a form that can be easily recalled and used in the future. Notes will result from speeches and lectures, class discussions, conversation, from solitary meditation, and from reading reference materials. In preparing term papers and research reports the notes that result from reading will be most significant. Without a careful, systematic system of note-taking, much of what is read is quickly forgotten.

Reading-reference notes have been classified under four principal categories:

1. *Quotation.* The exact words of an author are reproduced, enclosed in quotation marks. It is essential to copy each statement accurately, and to indicate the exact page reference so that the quotation may be properly footnoted in the written report.
2. *Paraphrase.* The reader restates the author's thoughts in his own words.
3. *Summary.* The reader states in condensed form the contents of the article.
4. *Evaluation.* The reader records his own reaction, indicating his agreement or disagreement, or interpreting the point of view of the writer.

A single note card may include several of these types when it seems appropriate.

A suggested method for taking notes

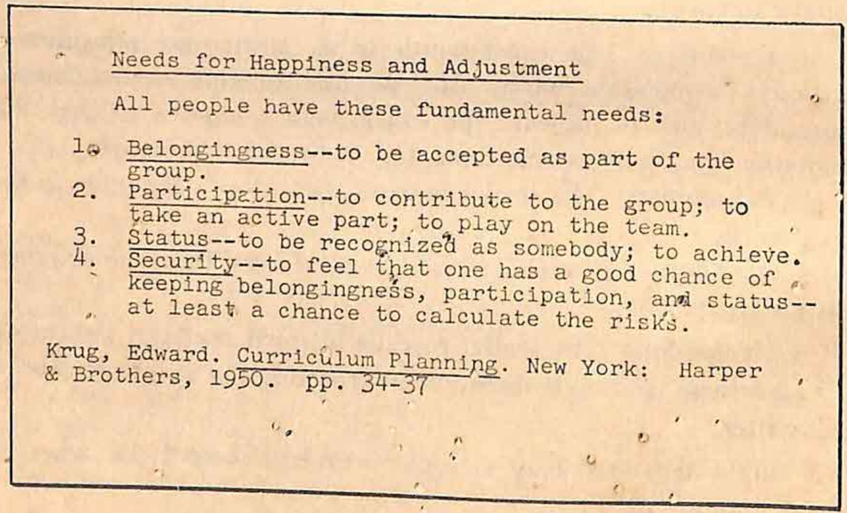
1. Skim the reference source before copying any notes. A bird's-eye view is essential before one can make a decision on what material to record and use. Selecting the most significant material is an art to be cultivated.

2. Use 4″ x 6″ index cards. They are easily sorted by subject headings, and are large enough to include a reasonable amount of material. Some students prefer 5″ x 8″ cards, which are less convenient to carry but provide more space for notes.

3. File each note card under a definite topic or heading. Place the subject heading at the top of the card for convenient filing. A complete bibliographic citation should be placed at the bottom of the note card. If a book has been used, the call number should be indicated to facilitate library location in the future.

4. Include only one topic on a card. This makes organization of notes flexible. If the notes are lengthy, use consecutively numbered cards, and slip a rubber band around them before filing.

5. Be sure that notes are complete and clearly understandable,



Needs for Happiness and Adjustment

All people have these fundamental needs:

1. Belongingness--to be accepted as part of the group.
2. Participation--to contribute to the group; to take an active part; to play on the team.
3. Status--to be recognized as somebody; to achieve.
4. Security--to feel that one has a good chance of keeping belongingness, participation, and status--at least a chance to calculate the risks.

Krug, Edward. Curriculum Planning. New York: Harper & Brothers, 1950. pp. 34-37

Fig. 3-3 Note card.

for they are not likely to be used for some time after they have been copied.

6. Distinguish clearly between a summary, a direct quotation of the author, a reference to the author's source, and an evaluative statement.

7. Don't plan to recopy or type your notes. It wastes time and increases possibility of error and confusion. Copy your notes carefully the first time.

8. Keep a supply of note cards with you at all times, so that you can jot down ideas that come to you while waiting, riding the bus, or listening to a lecture or discussion.

9. Be careful not to lose your notes. As soon as they are copied, file them in a card index box. If you must carry them with you, use the 4″ x 6″ or 5″ x 8″ accordion file folder, and be sure that your name and address is clearly printed on it.

10. Keep a permanent file of your notes. You may find the same notes useful in a number of courses or in writing a number of reports.

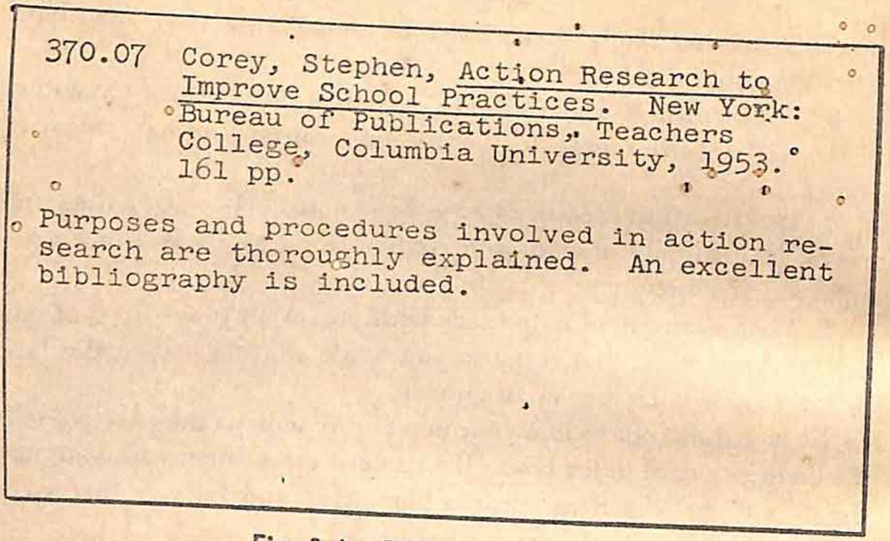
THE BIBLIOGRAPHY

In preparing a formal report or paper, it is customary to include a bibliography, indicating the references that have been used in preparing the report. Writing a brief descriptive comment or annotation adds to the usefulness of the entries.

The most convenient way to assemble and organize the bibliography is by the use of 3″ x 5″ bibliography cards. The card includes the call number (if the reference is a book), the name of the author, the facts of publication, and the annotation. Placing the information on cards makes it easy to assemble the author's names in the alphabetical order in which they are listed in the bibliography of the report.

Compiling a bibliography

Students often waste a great deal of time searching for references on a particular topic in an unsystematic way. Actually, on almost



370.07 Corey, Stephen, Action Research to Improve School Practices. New York: Bureau of Publications, Teachers College, Columbia University, 1953. 161 pp.

Purposes and procedures involved in action research are thoroughly explained. An excellent bibliography is included.

Fig. 3-4. Bibliography Card.

any topic there are many ready-made bibliographies that may be used in getting started.

The search for bibliographies is an ever-expanding process, for each reference leads to a new list of sources. While the order suggested below does not exhaust the process of compiling a bibliography, it does provide a systematic plan for getting underway. Start looking for references in the following order:

1. Recently published textbooks that specifically deal with your topic, or general textbooks that have sections or chapters devoted to the topic.
2. The library card catalogue.
3. The *Education Index.*
4. The *Encyclopedia of Educational Research.*
5. The *Review of Educational Research* (find the recent issues devoted to your problem area).
6. The *Bibliographic Index.*
7. Other specialized indexes and encyclopedias.
8. Yearbooks of professional societies or associations.

9. *School Review* or *Elementary School Journal.*
10. The *Cumulative Book Index.*

SUMMARY

Practically all that man knows can be found in books and in libraries. Both the professional worker in education and the graduate student, as consumers if not producers of research, should be familiar with the library and its many facilities and services. They should know about the most important reference sources in education and its related fields.

An extensive list of references has been presented, including many more than a student should be expected to remember. Those considered basic have been designated by an asterisk. (*) The course instructor may wish to indicate others. It is hoped that this chapter will serve as a useful ready reference when a particular need arises.

Skill in compiling a bibliography, and skill in taking, recording, and filing notes is essential for graduate students. The brief suggestions provided should be helpful to both students and professional workers in education.

BIBLIOGRAPHY

Akers, Susan Grey, *Simple Library Cataloging.* Chicago: American Library Association, 1954. 250 pp. An excellent basic reference on book classification.

American Association for Health, Physical Education and Recreation, *Research Methods Applied to Health, Physical Education and Recreation.* Washington: The Association, 1949. 535 pp. Read pp. 84–124.

Barzun, Jacques and Henry F. Graff, *The Modern Researcher.* New York: Harcourt, Brace and Co., Inc., 1957. 386 pp. Read Chap. IV.

Brickman, William, "Educational Reference Works," *School and Society,* 79:166–72, May 29, 1954.

Herdman, Margaret M., *Classification, An Introductory Manual.* Chicago: American Library Association, 1947. 50 pp. Includes a history of book classification and a description of various systems.

Lawler, John, *The H. W. Wilson Company*. Minneapolis: University of Minnesota Press, 1950. 207 pp. A history of the publishing activities of the Wilson Company, and an account of its many library services.

Wiles, Kimball, "Are We Developing Skill in Fact Collecting?" *Journal of Educational Reesarch*, 38:617–623, April, 1945. Common errors in library procedures are described.

4

HISTORICAL RESEARCH

HISTORY IS A COMPLETE, ACCURATE, AND MEANINGFUL record of man's achievement. It is not merely a list of chronological events, but a truthful, integrated account in which persons and events are examined in relation to a particular time and place.

Man uses history to understand the present in light of past events and developments. It enables him to predict with some degree of assurance what is likely to happen in the future and, on the basis of that knowledge, to choose alternatives that will lead to more favorable decisions or courses of action.

The focus of history may be directed towards an individual, a group, an idea, a movement, or an institution. However, no one of these objects of historical observation can be considered in isolation. No man can be subjected to historical investigation without some consideration of his contribution to the ideas, movements, or institutions of a particular time or place. These elements are always interrelated. The focus merely determines the point of emphasis towards which the historical observer directs his attention.

Table 4-1 illustrates several of these interrelationships, taken from the history of education. For example, no matter whether the historian chooses for study the Jesuit Order, religious teaching orders, the Counter-Reformation, or Ignatius of Loyola, each of the other elements appears as a prominent influence or result, and as an indispensable part of the narrative.

WHAT IS HISTORICAL RESEARCH?

Historical research is the application of the scientific method of inquiry to historical problems. It demands standards of careful methodology and spirit comparable to those which characterize other types of research. Historical research involves identification and limitation of the problem; formulation of the hypothesis; collection, organization, verification, validation, and analysis of data; testing the hypothesis; and writing of the historical account. All of these steps lead to new understanding of the past and its relevance to the present and the future.

A knowledge of the findings of historical research is important to the professional worker in education. These studies provide important information concerning the effects of certain past educational practices, and may suggest programs for future action, based upon the evaluation of these past experiences. They also offer an explanation of the how and why of many of the theories and practices that have developed and that now prevail in the schools. They help educational workers to identify and evaluate fads and band-

TABLE 4-1

SOME EXAMPLES OF THE HISTORICAL INTERRELATIONSHIPS BETWEEN MEN, MOVEMENTS, AND INSTITUTIONS

Men	Movements	Institutions	
		Type	Specific
Ignatius of Loyola	Counter-Reformation	Religious Teaching Order	Society of Jesus, 1534 (Jesuit Society)
Benjamin Franklin	Scientific Movement Education for Life	Academy	Philadelphia Academy, 1751
Daniel Coit Gilman G. Stanley Hall Wm. Rainey Harper	Graduate Study and Research	University Graduate School	Johns Hopkins University, 1876 Clark University, 1887 University of Chicago, 1892
John Dewey	Experimentalism Progressive Education	Experimental School	University of Chicago Elementary School, 1896
W. E. B. Dubois Walter White	Racial Integration in the Public Schools	Persuasion Organization	National Assn. for the Advancement of Colored People, 1909
B. R. Buckingham	Scientific Research in Education	Research Periodical, Research Organization	Journal of Ed. Research, 1920 American Educational Research Assn., 1931

wagon schemes that have appeared on the educational scene before. They also contribute to an understanding of the significance of education and the interrelationship between the school and the society from which the school derives its functions.

The process of historical research presents some problems that make it a somewhat distinctive and difficult task. The selection of an appropriate problem is hazardous. The problem must be sufficiently delimited so that a satisfactory analysis is possible. Too often, beginners state the problem much too broadly. The experienced historian realizes that research must be a penetrating analysis of a limited problem, rather than the superficial examination of a broad area. The weapon of research is the rifle, not the shotgun.

A carefully formulated hypothesis is also necessary, for it gives direction or focus to the gathering and analysis of data. Without a clear hypothesis, historical data-gathering becomes a purposeless grubbing for facts, rarely leading to new truths for more adequate interpretation of the present and prediction of the future.

The gathering and analysis of data presents particular difficulties to the historian. Since he has not lived at the time, and is thus removed from the events that he investigates, he must draw his data from the experiences and observations of others. Occasionally, he may view relics or remains from the past. But in his interpretation he must depend upon inference and logical analysis, rather than upon direct experience. In order to have information that is trustworthy, he must rely on primary or first-hand accounts. This stage of the historical research process calls for a high degree of imagination, ingenuity, and resourcefulness. These qualities are the products of scholarship and long devotion to the method of historical analysis.

SOURCES OF DATA

Historical sources of data are usually classified into two main categories: primary sources, which are fundamental to historical research; and secondary sources, which may sometimes be used in the absence of primary data.

Primary sources of data

Primary sources consist of:

a) Remains or relics associated with a person, group, or period. Fossils, skeletons, tools, weapons, food, utensils, clothing, buildings, furniture, pictures, paintings, coins, and art objects are examples of those unconscious remains that were not deliberately intended for use in transmitting information or as records. However, these sources may provide clear evidence about the past. The contents of an ancient burial place, for instance, may reveal a great deal of information about the way of life of a people—food, clothing, tools, weapons, art, religious beliefs, means of livelihood, and customs.

b) Oral or written testimony, or the records kept and written by actual participants in, or witnesses of, an event. These sources are consciously produced for the purpose of transmitting information to be used in the future. Documents classified as primary sources are constitutions, charters, laws, court decisions, official minutes or records, autobiographies, letters, diaries, genealogies, contracts, deeds, wills, permits, licenses, affidavits, depositions, declarations, proclamations, certificates, lists, handbills, bills, receipts, newspaper and magazine accounts, advertisements, maps, diagrams, books, pamphlets, catalogues, films, pictures, paintings, inscriptions, recordings, transcriptions, and research reports.

Secondary sources of data

Secondary sources are the reports of a person who relates the testimony of an actual witness of, or participant in, an event. The writer of the secondary source was not on the scene of the event. He merely reports what the person who was there said or wrote. Secondary sources of data are usually of limited worth because of the usual errors that result when information is passed on from one person to another. Most history textbooks and encyclopedias are examples of secondary sources, for they are often several times removed from the original, first-hand account of events.

Some types of material may be secondary sources for some purposes and primary sources for another. For example, a high school textbook in American history is ordinarily a secondary source. But if one were making a study of the changing emphasis on nationalism in high school American history textbooks, the book would be a primary document or source of data.

HISTORICAL CRITICISM

It has been noted that the historian does not often use the method of direct observation. Past events cannot be repeated at will. Since he must get much of his data from the reports of those who witnessed or participated in these events, the data must be subjected to careful analysis to sift the true from the irrelevant, false, or misleading.

Trustworthy, usable data in historical research are known as historical evidence. It is that body of validated facts and information that can be accepted as trustworthy, as a valid basis for the testing and interpretation of the hypothesis. Historical evidence is derived from historical data by the process of criticism, and is of two types: external criticism and internal criticism.

External criticism

External criticism establishes the authenticity or genuineness of data. Is the remain or document a true one rather than a forgery, a counterfeit, or a hoax? Various tests of genuineness may be employed.

The problem of establishing age or authorship of documents may involve many intricate tests of signature, handwriting, script, type, spelling, language usage, documentation, knowledge available at the time, and consistency with what is known. It may involve physical and chemical tests of ink, paint, paper, parchment, cloth, stone, metals, or wood. Are these elements consistent with known facts about the person, the knowledge available, and the technology of the period in which the remain or the document originated?

Internal criticism

After the authenticity or genuineness of a historical document or relic has been established, there is still the problem of evaluating its accuracy or worth. While it may be genuine, does it reveal a true picture? What of the writer or creator? Was he competent, honest, unbiased, and actually acquainted with the facts, or was he too antagonistic or too sympathetic to give a true picture? Did he have any motives for distorting the account? Was he subject to pressure, fear, or vanity? How long after the event did he make a record of his testimony, and was he able to remember accurately what happened? Is the witness in agreement with other competent witnesses?

These questions are often difficult to answer, but the historian must be sure that his data are authentic and accurate. Only then may he introduce them as historical evidence, worthy of serious consideration. The following examples illustrate how the processes of historical criticism were used to expose a hoax and to establish the authenticity of an important historical discovery.

The Cardiff Giant

An amazing series of events concerning the authenticity of a historical remain is related in "The Real Story of the Cardiff Giant," by Alan Hynd.[1] The Cardiff Giant was a ten-foot, four-and-one-half-inch figure of a man, weighing about 3,000 pounds, found in 1869, buried three feet beneath the surface of a farmer's field, near Cardiff, New York, about thirteen miles south of Syracuse.

The huge figure was examined by two scientists from Yale University, who pronounced it a fossilized human figure. A delegation of archeologists from the New York State Museum were of the opinion that the figure was an ancient statue. Ralph Waldo Emerson called it a *bona fide* petrified human being, while Dr. Oliver Wendell Holmes, the celebrated Harvard anatomist and father of the great jurist, declared that it was a statue of great antiquity. Scores of clergymen who came to see it enthusiastically claimed that the figure was a fossilized man of Biblical times, proving the story of Genesis to be literally true.

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[1] Originally published in *True*, "The Man's Magazine," later anthologized in *Grand Deception*, ed. Alexander Klein (Philadelphia: J. B. Lippincott Co., 1955), pp. 126–135. Used here by permission of Fawcett Publications.

The local owners turned down an offer by P. T. Barnum to buy the figure, whereupon Barnum commissioned a sculptor to make an exact replica of the Giant, which he later exhibited in his museum on Broadway in New York City, advertising it as the one, the only, the original Cardiff Giant. When the Cardiff owners sought an injunction against Barnum, the judge denied it, saying that the original was only a fake.

An unknown newspaper reporter, prompted by the growing feeling that the giant was a hoax, traced the shipment of a huge box labeled machinery to the farm near Cardiff, nearly a year before the Giant's discovery. Carefully tracing back detail upon detail, he discovered that a Mr. Hull had acquired a huge block of gypsum at Ft. Dodge, Iowa, and had shipped a box labeled machinery, weighing exactly what the block of gypsum had weighed, to Chicago. From hotel, railroad, and drayage company records, he traced the shipment to a barn in the 900 block of North Clark Street in Chicago. The owner of the barn confessed his part in the scheme and implicated Hull, a stonecutter, and an artist who had fashioned the figure.

It was revealed that Hull, while visiting his sister in Ft. Dodge, Iowa, had gone to hear an evangelist who, while preaching about the sixth chapter of Genesis, had described in some detail and with much enthusiasm the "giants in the earth" mentioned there. Seeing a chance to make some easy money, Hull planned to have one of these giants fabricated, aged with sulphuric acid, secretly planted in the ground on his cousin's New York farm, and accidentally discovered by some well-diggers, ostensibly hired to dig a new well.

The rest was easy. Hull made no claims. The clergymen and the experts made the claims for him, and the controversy between them only added to the fame (and money-drawing power) of his stone figure.

While this story does not actually illustrate scholarly research, the activities of the reporter represent a simple example of external criticism, for by following his hunch or hypothesis that the figure was recently man-made, and not an ancient statue or a fossilized man, he tracked down and exposed the facts. This is quite remarkable in the light of the fact that prominent archeologists, anatomists, and scholars had been completely fooled by the hoax.

The following example describes historical criticism of a more scholarly type, carried on by scientists and Biblical scholars, in which historic documents were proven to be genuine.

The Dead Sea Scrolls

One of the most interesting and most significant historical discoveries of the past few decades was the finding of the Dead Sea Scrolls. This collection of ancient manuscripts was discovered in 1947 by a group of Bedouins of the Ta'amere tribe. Five leather scrolls were found, sealed in tall earthenware jars in the Qumran caves near Aim Feshkha, on the northwest shore of the Dead Sea.[2]

The Bedouins took the scrolls to Metropolitan Mar Athanesius Yeshue Samuel, of St. Mark's monastery in Jerusalem, who purchased them after discovering that they were written in ancient Hebrew. A consultation with Biblical scholars confirmed the fact that they were very old and possibly valuable. They were later purchased by Professor Sukenik, an archeologist of Hebrew University at Jerusalem, who began to translate them. He also had portions of the scrolls photographed to send to other Biblical scholars for evaluation. Upon examining some of the photographs, Dr. William F. Albright of Johns Hopkins University pronounced them "the greatest manuscript discovery of modern times."[3]

[2] A. Powell Davies, *The Meaning of the Dead Sea Scrolls* (New York: New American Library of World Literature, Inc., 1956), p. 9. Used with permission of the publisher.

[3] Edmund Wilson, *The Scrolls From the Dead Sea* (New York: Oxford University Press, 1955), p. 18. Used with permission of the author.

A systematic search of the Wadi Qumran area caves in 1952 yielded other leather scrolls, many manuscript fragments, and two additional scrolls of copper, so completely oxidized that they could not be unrolled without being destroyed. By 1956, scientists at the University of Manchester, England, had devised a method of passing a spindle through the scrolls, spraying them with aircraft glue, baking them, and then sawing them across their rolled-up length to yield strips which could be photographed.[4]

There has been much controversy about the scrolls as to their origin, their age, and their historic value. By careful and systematic external and internal criticism, certain facts have been established and quite generally accepted by Biblical scholars and scientists.

The scrolls are very old, probably dating back to the first century A.D. They are written in ancient Hebrew, and probably originated in a pre-Christian monastery of one of the Jewish sects. The writings contain two versions (one complete and one incomplete) of the Book of Isaiah, a commentary or *Midrasn* on the Book of Habakkuk, a set of rules of the ancient Jewish monastery, a collection of about twenty Psalms similar to those of the Old Testament, and several scrolls of apocalyptic writings, similar to the Book of Revelations.[5]

The contents of the copper scrolls and other fragments are in the process of translation. It is possible that more scrolls and writings may be discovered in the area, and it is likely that these ancient documents may throw new light on the Bible and the origins of Christianity.

It is interesting to note how these documents were authenticated, dated, and evaluated:

1. By an analysis of the Hebrew alphabet forms used.
2. By a radio-carbon test of the age of the linen scroll coverings, conducted by the Institute of Nuclear Research at the University of Chicago.
3. By careful examination of the pottery form in which the scrolls were sealed.

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[4] Davies, *op. cit.*, p. 18.

[5] Davies, *op. cit.*, p. 19.

4. By examination of coins found in the caves with the scrolls.
5. By a translation of the scrolls that was compared to other writings, both Biblical and non-Biblical, of known antiquity.

While external criticism has now produced convincing evidence of the genuineness and age of the documents, internal criticism of their validity and relevance will be pursued by Biblical scholars for many years to come, and may provide many new hypotheses concerning Biblical writings and the early history of Christianity and the pre-Christian Jewish sects.

Synthesis

After the data have been gathered and subjected to external criticism for genuineness, and to internal criticism for trustworthiness, the problem of synthesis remains. The historian must piece together into a meaningful pattern the evidence that has been gathered, and then apply it to the testing of the hypothesis. This phase of historical research calls for a great deal of imagination and resourcefulness, as well as careful adherence to the method of logical thinking.

Writing the report

No less challenging is the writing of the report, which calls for creativity in addition to the qualities previously mentioned. Research reports should be written in a style that is dignified and objective. However, the historian is permitted a little more freedom in reporting. Homer Carey Hockett suggests that "the historian is not condemned to a bald, plain, unattractive style," and that "for the sake of relieving the monotony of statement after statement of bare facts, it is permissible, now and then, to indulge in a bit of color." He concludes, however, by warning that "above all, embellishments must never become a first aim, or be allowed to hide or distort the truth."[6]

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[6] Homer C. Hockett, *Introduction to Research in American History* (New York: The Macmillan Co., 1948), p. 139. Used with permission of the publisher.

An evaluation of graduate students' historical-research projects generally reveals one or more of these faults:

1. Problem too broadly stated.
2. Tendency to use easy-to-find secondary sources of data, rather than sufficient primary sources, which are harder to locate but usually more trustworthy.
3. Inadequate historical criticism of data, due to failure to establish authenticity of sources and trustworthiness of data. For example, there is often a tendency to accept a statement as necessarily true when several observers agree. It is possible that one may have influenced the other, or that both were influenced by the same inaccurate source of information.
4. Poor logical analysis resulting from:
    a) Oversimplification—failure to recognize the fact that causes of events are more often multiple and complex than single and simple.
    b) Overgeneralization on the basis of insufficient evidence, and false reasoning by analogy, basing conclusions upon superficial similarities of situations.
    c) Failure to interpret words and expressions in the light of their accepted meaning in an earlier period.
    d) Failure to distinguish between significant facts in a situation and those that are irrelevant or unimportant.
5. Expression of personal bias, as revealed by statements lifted out of context for purposes of persuasion, assuming too generous or uncritical an attitude towards a person or idea (or being too unfriendly or critical), excessive admiration for the past (sometimes known as the "old oaken bucket" delusion), or an equally unrealistic admiration for the new or contemporary, assuming that all change represents progress.
6. Poor reporting in a style that is dull and colorless, too flowery, or flippant, too persuasive or of the "soap-box" type, or lacking in proper usage.

Most of these faults represent a failure to apply the high standards of objective, systematic, and logical analysis which characterize true historical research.

SCHOOL LAW RESEARCH

Research in school law is an application of the methodology of historical research. If one has access to a university law school library, practically all of the necessary data involved in the research are available. However, the interpretation of legal problems involves an expertness that few graduate students in education possess. The ability to find the significant controlling facts in a case, and the ability to distinguish the basic principles at issue, are competencies that require more than a superficial understanding of the law and legal procedures.

In order to carry on significant research in the area of school law, it would be desirable for the student to have had several courses in school law, some law school training, and the aid of a school law specialist. Most graduate schools have such experts on their faculty.

The law is classified into two main categories:

1. *Statutory law* includes provisions written into state and federal constitutions, the legislative enactments of state legislatures and the Congress, and administrative laws and regulations, having the force of law, promulgated by appointed bodies and commissions.
2. *Case or common law* includes the principles established by the courts in deciding issues not covered by statutory law, but based upon sound principles of public policy. It must be remembered that laws or regulations are of unknown validity until they have been tested in a court of law, and their constitutionality verified by the authority of the highest courts of appeal, the supreme courts of the various states, or the Supreme Court of the United States.

M. M. Chambers has presented a list of suggestions on how to study and use law decisions.[7]

> 1. Observe what court is being reported and, if the case is on appeal, from what court or courts it has been appealed.
> 2. Observe the form in which the action is brought—whether it is a petition for a writ of mandamus, injunction, quo warranto, or prohibition; or a suit for pecuniary damages in tort or in contract; or an action in equity for the specific performance or reformation of a contract or for an accounting of partnership or corporation affairs; or a criminal action brought in the name of the state against a defendant accused of violation of a penal statute.
> 3. Segregate and digest the statement of the facts of the case, before trying to understand the application of the law to the facts.

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[7] M. M. Chambers, "Legal Research in Education," *Review of Educational Research*, XXI:462–463, December, 1939. Used with permission.

4. Determine what is the precise question of law which the court is called upon to decide. The courts' answer to this precise point is the decision of the case.
5. Note whether the decision seems to be in harmony with any broadly accepted rule of law. (Often the court will state the broad rule.)
6. Note whether the judge indulges in any discussion of points on which the court is not called upon to decide. Judicial pronouncements not directly related to the ratio dicidendi, or determination of the legal issue in the case, are called dicta, and rank much lower than a decision in point of weight as precedents. Nevertheless, a mere dictum often is a figurative bomb packed full of brilliant philosophy which will illuminate its area of the law for years to come.
7. In view of the fact that all courts of last resort and most appellate courts are collegial—that is, consisting of several judges sitting *en banc*—note whether the decision and the opinion are concurred in by all the judges sitting, or whether one or more judges have filed specially concurring opinions or dissenting opinions. These may be important for the sake of the social philosophy they express. A large proportion of the essential wisdom to be extracted from the records of the United States Supreme Court for a generation past is to be found in the long line of brilliant dissenting opinions by the late Justice Oliver Wendell Holmes. These opinions were frequently concurred in by Justice Brandeis, later by Justices Stone, Roberts and Chief Justice Hughes, finally coming to represent the social philosophy of a majority of the court in many particulars.
8. Try to orient the case in your own social and legal philosophy; evaluate the decision and the opinion critically, sympathetically, tolerantly; struggle to interpret it and express it vividly and meaningfully; make it live in the mind of your reader.
9. Get the complete caption and citation, including date.
10. Jot down the supporting authorities cited in the course of the opinion and follow them up, thus developing the history of the principles of law involved and disclosing trends.

A comprehensive and annotated list of school law references is included in Chapter 3. The beginner is advised to refer to some of the basic textbooks in school law, such as Edwards, Hamilton and Mort, or Remmlein, and to consult a dictionary of legal terms, before attempting to interpret the court decisions that make up the primary sources of school law (see Chapter 3).

SUMMARY

History, the complete, accurate, and meaningful record of man's achievement, helps him to understand the present and to predict somewhat the future. Historical research is the application of the scientific method to the description and analysis of past events.

The historian ordinarily draws his data from the observations and experiences of others. Since he is not likely to have been at the scene of the event, he must use logical inferences to supplement what is probably an incomplete account.

Primary sources may be "unconscious" testimony, not intended to be left as a record—relics or remains such as bones, fossils, clothing, food, utensils, weapons, coins, and art objects are useful. Conscious testimony, in the form of records or documents, is another primary source of information—examples are Constitutions, laws, court decisions, official minutes, autobiographies, letters, contracts, wills, certificates, newspaper and magazine accounts, films, recordings, and research reports.

Historical criticism is the evaluation of primary data. External criticism is concerned with the authenticity or genuineness of remains or documents. Internal criticism is concerned with the trustworthiness or relevance of materials. The story of the Cardiff Giant and the account of the Dead Sea Scrolls illustrate the processes of historical criticism.

The historical research studies of graduate students often reveal serious limitations. Frequently encountered are such faults as stating the problem too broadly, inadequate primary sources of data, unskillful historical criticism, poor logical analysis of data, personal bias, and ineffective reporting.

Research in school law is usually considered a phase of historical research, with statutes and court decisions providing the primary sources of data. This field of inquiry is not an appropriate one for the inexperienced student of law, for it requires an expertness that few graduate students possess. Some specialized law training, several courses in school law, and the counsel of a law expert are desirable, if not necessary, qualifications.

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5

DESCRIPTIVE RESEARCH

* * *

DESCRIPTIVE RESEARCH DESCRIBES AND INTERPRETS *what is.* It is concerned with conditions or relationships that exist; practices that prevail; beliefs, points of view, or attitudes that are held; processes that are going on; effects that are being felt; or trends that are developing.

The process of descriptive research goes beyond mere gathering and tabulation of data. It involves an element of interpretation of the meaning or significance of what is described. Thus, description is often combined with comparison or contrast, involving measurement, classification, interpretation, and evaluation.

Unfortunately, there has been little agreement on the meaning of many of the terms used in the field of social research. Some authors have called this type of analysis *descriptive research*. Since all types of research involve an element of description, however, this term is not entirely satisfactory. Others have used the term *survey research*, but this term is frequently used in referring to a particular type of descriptive study. Since there is no general agreement, the selection of a term must be somewhat arbitrary, with the realization that any label that is selected may be criticized on the basis of logic or usage.

The author has selected the term *descriptive research*, trusting that the treatment of this chapter will be reasonably logical and consistent. Important as terminology is, the more important task is to develop an understanding of the nature of this broad classification of methodology, to appreciate its value in helping to solve educational problems, and to acquire some skill in applying its various techniques for problem-solving.

At the outset, it must be emphasized that merely describing *what is* does not comprise the entire research process. Although the gathering of data and the description of prevailing conditions or practices are necessary steps, the research process is not completed until the data are organized and analyzed, and significant conclusions are derived. These conclusions will be based upon comparisons, contrasts, or relationships of one kind or another. Thus, the discovery of meaning is the focus of the whole process.

While some experimental studies of human behavior can be appropriately carried on, both in the laboratory and in the field, the prevailing method of the social sciences is descriptive. Under the conditions that naturally occur in the home, the classroom, the recreation center, the factory, or the community, human behavior can be systematically examined and analyzed. This analysis may lead to the modification of factors or influences that determine the nature of human interaction. It is through this modification of factors that social institutions may become more effective influences in the promotion of human welfare.

DESCRIPTIVE RESEARCH IN PROBLEM-SOLVING

In solving a problem or charting a course of action several sorts of information may be needed. These data may be gathered through the processes of the descriptive method.

The first type of information is based upon *present conditions.* Where are we now? From what point do we start? These data may be gathered by a systematic description and analysis of all the important aspects of the present situation.

The second type of information involves *what we may want.* In what direction may we go? What conditions are desirable or are considered to represent best practice? This clarification of objectives or goals may come from a study of what we think we want, possibly resulting from a study of conditions existing elsewhere, or what experts consider to be adequate or desirable.

The third type of information is concerned with *how to get there.* This analysis may involve finding out about the experience of others who have been involved in similar situations. It may involve the opinions of experts, who presumably know best how to reach the goal.

Some research studies emphasize only one of these aspects of problem-solving. Others may deal with two, or even three, of the elements. Although a research study does not necessarily embrace all of the steps necessary for the solution of a problem, it may make a valuable contribution by clarifying but one of the necessary steps —from description of present status to the charting of the path to the goal.

Descriptive research may supply some, or all, of the needed information. An example may serve to illustrate how descriptive studies can be used to help solve an educational problem.

Washington Township has a school building problem. Its present educational facilities seem inadequate, and if present developments continue, conditions may be much worse in the future. The patrons and educational leaders in the community know that a problem exists, but they realize that this vague awareness does not provide a sound basis for action.

The first step involves a systematic analysis of present conditions. How many school-age children are there in the township? How many children are of preschool age? Where do they live? How many classrooms now exist? How adequate are they? What is the average class size? How are these present buildings located in terms of residential housing? How adequate are the facilities for food, library, health, and recreational services? What is the present annual budget? How is it related to the tax rate and the ability of the community to provide adequate educational facilities?

The second step projects goals for the future. What will the school population be in five, ten, or twenty years? Where will the children live? How many buildings and classrooms will be needed? What provisions should be made for special school services, for libraries, cafeterias, gymnasiums, and play areas to take care of expected educational demands?

Step three considers *how to reach those goals,* established by the analysis of Step two. What kind of buildings should be provided? Should schools be designed for grades one through eight, or should six-year elementary schools and separate three-year junior high schools be provided? How will the money be raised? When and how much should the tax rate be increased? When should the building program get under way?

Many of the answers to the questions raised in Steps two and three will be arrived at by analysis of practices of other townships, the expressed opinions of school patrons and local educational leaders, and the opinions of experts in the areas of school buildings, school organization, community planning, and public finance. Of course, this analysis of school building needs is but one phase of the larger educational problem of providing an adequate educational program for tomorrow's children. There remain problems of curriculum, pupil transportation, and school personnel. These problems can also be attacked by using similar methods of descriptive research.

TYPES OF DESCRIPTIVE STUDIES

In attempting to classify the various types of descriptive studies, one again confronts the problem of generally accepted terminology. In the field of social research, two of the terms, *survey* and *case study,* are used without the exactness that one might desire. For example, the interesting and significant studies made of Muncie, Indiana, by Robert and Helen Lynd, published under the titles *Middletown*[1] and *Middletown in Transition,*[2] have been classified as surveys by some writers,[3] and as case studies by others.[4] One prominent author refers to them as field studies.[5]

The rationale of this presentation is based upon a fairly clear distinction which the reader is urged to note carefully. In brief, the *survey* is extensive and cross-sectional, dealing with a relatively large number of cases at a particular time, and yielding statistics that are abstracted from particular cases. The *case study* is intensive and longitudinal, analyzing carefully a single case or a limited number of typical cases. (A case may be an individual, a type, a group, or an institution.) The analysis is detailed and complete, noting change, growth, or development in the life cycle (or an important part of the life cycle) of the case under consideration.

These distinctions are presented as points of reference. In some research studies one may find characteristics of each approach, making any classification difficult. Using the rationale presented here, however, the Middletown studies, would be classified as case studies, for they intensively analyze the life of a typical community (case), tracing growth and change over a period of time.

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[1] Robert S. Lynd and Helen M. Lynd, *Middletown* (New York: Harcourt, Brace and Co., Inc., 1929).

[2] Robert S. Lynd and Helen M. Lynd, *Middletown in Transition* (New York: Harcourt, Brace and Co., Inc., 1937).

[3] Marie Jahoda, Morton Deutsch, and Stuart W. Cook, *Research Methods in Social Relation* (New York: Dryden Press, 1951), p. 48.

[4] Pauline V. Young, *Scientific Social Surveys and Research* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1949), p. 269.

[5] Leon Festinger and Daniel Katz, *Research Methods in Behavioral Sciences* (New York: Dryden Press, 1953), p. 60.

THE SURVEY METHOD

The survey method gathers data from a relatively large number of cases at a particular time. It is not concerned with characteristics of individuals as individuals. It is concerned with the generalized statistics that result when data are abstracted from a number of individual cases. It is essentially cross-sectional.

Forty million American homes have at least one television set. About three out of five students who enter the American secondary school remain to graduate. Sixty-three per cent of adult Americans voted in the 1952 presidential election. The average American consumes about ninety-seven pounds of refined sugar annually. The ratio of female births to male births in the United States in 1950 was 1210 to 1000. The population of Indiana, according to the 1950 census, was 3,934,224. Data like these result from many types of surveys. Each statement pictures a prevailing condition at a particular time.

In analyzing political, social, or economic conditions, one of the first steps is to get the facts about the situation—or a picture of conditions that prevail or that are developing. These data may be gathered from surveys of the entire population. Others are inferred from a study of a sample group, carefully selected to be representative of the total population. And at times, the survey may describe a limited population which is the only group under consideration.

The survey is an important type of research. It must not be confused with the mere clerical routine of gathering and tabulating figures. It involves a clearly defined problem and definite objectives. It requires expert and imaginative planning, careful analysis and interpretation of the data gathered, and logical and skillful reporting of the findings.

Social surveys

A significant social survey was made in the late 1930's under the direction of the Swedish sociologist, Gunnar Myrdal, and sponsored by the Carnegie Foundation. Myrdal and his staff of researchers made a comprehensive analysis of the social, political, and economic life of the American Negro, yielding a great mass of data on race relations in America.[6]

The late Alfred Kinsey of Indiana University made a comprehensive survey of the sexual behavior of the human male,[7] based on data gathered from over 12,000 cases. His second study of the behavior of the human female[8] was published five years later. While these studies have raised considerable controversy, they represent a scientific approach to the study of an important social problem, and have many implications for jurists, legislators, social workers, and educators.

Witty[9] has studied the television-viewing habits of school children, and has published annual reports on his investigations since 1950. These studies were conducted in the Chicago area, and indicate the amount of time devoted to viewing and the program preferences of elementary and secondary students, their parents, and their teachers. An effort was made to relate television viewing to intelligence, reading habits, academic achievement, and other factors.

Shaw and McKay[10] have made a study of juvenile delinquency in Chicago yielding significant data on the nature and extent of delinquency in large urban communities.

The National Safety Council conducts surveys on the nature, extent, and causes of automobile accidents in all parts of the United States. State high school athletic associations conduct surveys on the nature and extent of athletic injuries in member schools.

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[6] Gunnar Myrdal, *An American Dilemma: The Negro Problem and Modern Democracy* (New York: Harper & Brothers, 1944).

[7] Alfred C. Kinsey, *et al.*, *The Sexual Behavior of the Human Male* (Philadelphia: W. B. Saunders Co., 1948).

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[9] Paul Witty, "Children and T.V.: A Fifth Report," *Elementary English*, 31:349–357, October, 1955.

[10] Clifford R. Shaw and Henry D. McKay, *Juvenile Delinquency in Urban Areas* (Chicago: The University of Chicago Press, 1942).

School surveys

Many city, township, and county school systems have been studied by the survey method for the purpose of determining school needs. These surveys are sometimes carried on for a nominal fee as a service by the research bureau of a university in the area. Frequently, a large part of the data-gathering is done by local educators, with the university staff providing direction and advisory services.

A study of the school system in Wayne Township, Marion County, Indiana, illustrates the type of cooperative survey described above.[11] Surveys of this type carefully study such items as the nature of the community, present plant and equipment, curriculum, staff personnel, pupil transportation, school budget, financial resources, and other phases of school administration. On the basis of present conditions and likely future demands, recommendations are made for community action.

A statewide survey of the public schools of Indiana [12] was conducted in 1947 by the Indiana School Study Commission, an agency created for the purposes of the survey. Directed by a fifty-seven member committee of laymen and professional educators, a thorough study was made of all aspects of public education in Indiana. Hundreds of administrators, classroom teachers, and college people participated in the study, aided by seven out-of-state specialists who guided various phases of the survey. Recommendations for action were made on the basis of the findings, providing a sound basis for planning the future of public education in the state.

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[11] School of Education, Indiana University, *A Cooperative Study of the Public School Enrollment and the School Building and Financial Needs of Wayne Township, Marion County, Indiana* (Bloomington, Ind.: Division of Research and Field Services, Indiana University, 1955).

[12] *An Evaluation of the Indiana Public Schools* (Indianapolis: Indiana School Study Commission, 1949), 418 pp.

A helpful guide providing directions for conducting school surveys has been published by the Department of Public Instruction of the State of Indiana.[13]

Public-opinion surveys

In our culture, where so many opinions on controversial subjects are expressed by well-organized special-interest groups, it is important to find out what the people think. Without a means of polling public opinion, the views of only the highly organized minorities are effectively presented through the printed page, radio, and television.

How do people feel about the admission of Red China to the United Nations, the foreign aid program, racial integration in the public schools, compulsory military training, the adequacy of the public schools, and federal aid to education? What candidate do they intend to vote for in the next election? Such questions can be partially answered by means of the public-opinion survey. Many research agencies carry on these surveys and report their findings in magazines and in syndicated articles in daily newspapers.

Since it would be impracticable or even impossible to get an expression of opinion from every person, sampling techniques are employed in such a way that the resulting opinions of a limited number of people can be assumed to be representative or typical of the reactions of the entire population.

The names Gallup, Roper, and Crossley are familiar to newspaper readers as names associated with public-opinion surveys. These surveys of opinion are frequently analyzed and reported by such classifications as age groups, sex, educational level, occupation, income level, political affiliation, or area of residence. Researchers are aware of the existence of many publics, or segments of the public, who may hold conflicting points of view. This further analysis of opinion by subgroups adds meaning to the analysis of public opinion in general.

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[13] *How to Study School Building Needs: A Workbook for Local School Survey Committees* (Indianapolis: Department of Public Instruction, State of Indiana, 1953), 163 pp.

In evaluating public-opinion analysis several possible sources of error may be recognized. The problem of accurate sampling is an important element. The failure of the 1936 *Literary Digest* Poll to accurately forecast the results of the Landon-Roosevelt campaign has been attributed to a bias in sampling. The survey chose its respondents from automobile registrations lists and from telephone directories. During the depression period, large numbers of voters neither owned cars nor were telephone subscribers, and consequently were not represented in the sample.

In the 1948 election campaign a prominent poll predicted the election of Governor Thomas E. Dewey over President Harry S. Truman. Again the pollsters were wrong, possibly this time because they failed to recognize the shifting nature of public sentiment. Had the survey been made just prior to election day, a more accurate prediction might have resulted.

In addition to the limitations suggested, there is the hazard of careless responses, given in an off-hand way, that are sometimes at variance with the more serious opinions that are expressed as actual decisions.

Market surveys

Attempts to measure public reaction to consumer products or to evaluate the effectiveness of advertising is a specialized application of the public-opinion survey. This type of analysis has important implications for designers, manufacturers, distributors, and advertisers of products in their choice of color, composition, shape, and size of the product or the container in which it is packaged and displayed.

From a carefully selected sample the market researcher attempts to discover how the potential customer feels about the product. Using questionnaires or interviews, the opinions of the sample group are carefully gathered for analysis. Upon the basis of these data the producer and advertiser may present the most attractive or acceptable product, and predict with some degree of accuracy the likelihood of successful marketing.

Manufacturers in the modern competitive market are reluctant to risk the millions of dollars necessary to launch a new product or a new model without some evidence of probable public acceptance.

MOTIVATION RESEARCH

Recently a new type of consumer analysis has been developed. Known as motivation research, it probes the hidden feelings and wishes of consumers. Using the technique of depth interviews, psychologists analyze hidden, unconscious motives of which the consumer himself is unaware.

For example, motivation researchers contend that an automobile is much more than a means of transportation: It is an expression of what an individual wants to be or what he thinks he is. The automobile is an instrument of self-expression. When interviewed as to what qualities they wanted in a car, individuals consistently ranked in order: economy, appearance, dependability, convenience, and safety. When asked what their friends considered most important, they ranked in order: appearance, size, and horsepower. Motivation researchers conclude that the values that individuals attribute to their friends are really their own hidden motives. They are projecting their own desires for power and prestige, and when they themselves buy a new car, it is on the basis of appearance, size, and horsepower. Packard has described the techniques of motivation research in *The Hidden Persuaders*.[14] This application of the descriptive method has become an important element in market analysis, product design, and sales promotion.

THE CASE STUDY

When the focus of attention is directed towards a single case or a limited number of cases, the process is personalized. The case study is concerned with everything that is significant in the history or development of the case. The purpose is to understand the life cycle, or an important part of the life cycle, of an individual unit. This unit may be a person, a family, a group, a social institution, or an entire community. The case method probes deeply, and intensively analyzes interaction between the factors that produce change or growth. It emphasizes the longitudinal or genetic approach, showing development over a period of time.

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[14] Vance Packard, *The Hidden Persuaders* (New York: David McKay Co., 1957).

Traditionally, in social work or in the field of guidance the term *case study* has assumed a more limited meaning. In this context emphasis is placed upon the study of an individual person, for the purpose of diagnosing his problems and recommending remedial measures for his rehabilitation. Here the emphasis is not upon the individual representing a type, but upon the individual as a unique personality, with his own constellation of problems and needs. Ordinarily, the social-work or guidance case study is not research-oriented, but is directed towards the solution of an individual's problems. A study of a number of these individual cases could be expanded into a research project, particularly where the typical aspects of each case are contrasted or compared for the purpose of arriving at a greater understanding of human behavior, or for the purpose of discovering new generalizations.

Case studies of the descriptive research type have been made of all types of communities, from the hamlet to the great metropolis. Case studies have been made of types of individuals—alcoholics, drug addicts, juvenile delinquents, migratory agricultural workers, share-croppers, industrial workers, members of a profession, executives, army wives, trailer court residents, members of a social class, Quakers, Amish, Jews, Negroes, American Indians, Chinese-Americans, Puerto Ricans, and many other ethnic or social groups. Such institutions as colleges, churches, factories, hospitals, corrective institutions, welfare agencies, fraternal organizations, and business groups have been studied as cases. In each case the element of typicalness is the focus of attention, with emphasis upon the many factors that characterize the type. These studies have been conducted for the purpose of arriving at greater understanding of the roles of their subjects in the American pattern of culture.

COMMUNITY STUDIES

The community study is a careful description and analysis of a group of people living together in a particular geographic location in a corporate way. The community study deals with such elements of the community as location, appearance, prevailing economic activity, climate and natural resources, historical development, how the people live, the social structure, goals or life values and patterns, the individuals or power groups who exert the dominant influence, the impact of the outside world, and an evaluation of the social institutions within the community that meet the basic human needs of health and protection, making a living, education, religious expression, and recreation. Such studies are case studies, with the community serving as the case under investigation. Communities that are chosen for study usually represent a typical pattern of social organization, size, type, or geographic location.

The community studies made by Robert and Helen Lynd and their associates at Muncie, Indiana, are well known. The first, reported in the volume *Middletown*[15] in 1929, and the second, *Middletown in Transition*[16] in 1937, describe the way of life of a typical midwestern, average-size city, tracing its development from the gas boom of the 1890's through World War I, the prosperity of the twenties, and the depression of the thirties. James West describes the nature of a very small community in the Ozark region in *Plainville, USA.*[17] Sherman and Henry[18] have studied the way of life of five "hollow" communities hidden away in the Blue Ridge mountains.

Some community studies have singled out particular aspects for special investigation. Drake and Cayton[19] have described life in the Negro section of Chicago. Hollingshead[20] has portrayed the status of adolescents in a small Illinois community. Warner[21] and his associates have delineated the social class structure of a New England community in their story of Newburyport, Mass.

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[15] Robert S. Lynd and Helen M. Lynd, *Middletown* (New York: Harcourt, Brace and Co., Inc., 1929).

[16] Robert S. Lynd and Helen M. Lynd, *Middletown in Transition* (New York: Harcourt, Brace and Co., Inc., 1937).

[17] James West, *Plainville, USA* (New York: Columbia University Press, 1945).

[18] Mandel Sherman and Thomas R. Henry, *Hollow Folk* (New York: Crowell Publishing Co., 1933).

[19] St. Clair Drake and H. R. Cayton, *Black Metropolis* (New York: Harcourt, Brace and Co., Inc., 1945).

CAUSAL COMPARATIVE STUDIES

Another type of descriptive research seeks to find the answers to problems through the analysis of causal relationships. What factors seem to be associated with certain occurrences, conditions, or types of behavior? Since it is often impracticable to arrange occurrences, an analysis of what actually does happen is the only feasible way to study causation.

For example, we would not arrange fatal automobile accidents in order to study their causes. But we can study the conditions associated with fatal accidents to attempt to find the factor or factors associated with them. Police departments, safety commissions, and insurance companies are constantly studying the problems of highway safety. If the causes of accidents could be determined, certain preventative measures could be adopted. Such factors as excessive speed, poor mechanical condition of the vehicles involved, driving under the influence of alcohol, and many other factors have been blamed.

By the methodology of descriptive research, the relative importance of these factors may be investigated. If, for example, excessive speed were associated with a high proportion of fatal accidents, state legislatures could attack the problem of highway safety by passing more stringent laws controlling speed, or by more rigid enforcement of existing speed laws. If a high proportion of vehicles involved in accidents revealed mechanical defects, compulsory, periodic vehicle inspection might be effected. The need for engineering improvements in auto construction might also be suggested.

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[20] August B. Hollingshead, *Elmtown's Youth* (New York: John Wiley and Sons, Inc., 1949).

[21] W. Lloyd Warner and Paul S. Lunt, *Social Life of a Modern Community*, Vol. I, "Yankee City Series" (New Haven: Yale University Press, 1941).

Studies of juvenile delinquency may compare the social and educational backgrounds of delinquents and nondelinquents. What factors, if any, were common to the delinquent group? What factors, if any, were common to the nondelinquent group? Any factors common to one group, but not to the other, might serve as a possible explanation of the underlying causes of delinquency.

Some efforts have been made to associate good or poor teaching with the type of educational institution in which the teachers prepared. Those studies have proved inconclusive, possibly for a number of reasons. In addition to the difficulty of finding a valid and satisfactory criteria of good and poor teaching, many factors, other than type of college attended, seem to be significant. Such variables as quality of scholarship, socio-economic status, personality qualities, types of nonschool experiences, attitudes toward the teaching profession, and a host of others have possible relevancy.

It is apparent that while the causal comparative method has some merit in solving social problems, it has many limitations. Failure to single out the really significant factor, failure to recognize that events often have multiple rather than single causes, basing conclusions on a too-limited number of occurrences, and failure to recognize that factors may go together without having a cause-effect relationship, may lead the researcher to false or misleading conclusions.

A humorous example of spurious causal relationships is illustrated by the man who became drunk when he drank water mixed with gin, water mixed with bourbon, and water mixed with brandy. He concluded that, since water was associated with each apparent cause, he would reform by giving up water.

ACTIVITY ANALYSIS

The analysis of the activities or processes that an individual is called upon to perform is important, both in industry and in various types of social agencies. This process of analysis is appropriate in any field of work and at all levels of responsibility. It is useful in the industrial plant, where needed skills and competencies of thousands of jobs are carefully studied, jobs ranging in complexity from that of unskilled laborer to that of plant manager.

In school systems the roles of the superintendent, the principal, the teacher, and the custodian have been carefully analyzed to discover what these individuals do and need to be able to do. The Commonwealth Teacher Training Study[22] made under the direction of Charters and Waples described and analyzed the activities of several thousand teachers, and searched previous studies for opinions of writers on additional activities in which classroom teachers should engage.

This type of analysis may yield valuable information that would prove useful in:

1. Establishing the requirements for a particular job or position.
2. Setting up a program for the preparation or training of individuals for various jobs or positions.
3. Setting up an in-service program for improvement in job competence, or for the up-grading of individuals already employed.
4. Establishing equitable wage or salary schedules for various jobs or positions.

TIME-AND-MOTION STUDY

This more highly refined type of analysis in industrial plants consists of the observation and measurement of actual body movements involved in the performance of a production job. The stop watch and the motion picture camera are frequently used to make the observation and measurement more exact.

Studies of this type may result in improved design of machinery and equipment, more effective placement and flow of materials, and reduction of waste motion and fatigue. All of these factors may result in increased hourly output of both worker and machine.

CONTENT OR DOCUMENT ANALYSIS

Content analysis, sometimes known as document analysis, deals with the systematic examination of current records or documents as sources of data. While documents usually consist of written or printed words or figures, they may be of the graphic type, and include paintings, drawings, cartoons, or photographs. Some studies may merely gather and classify factual data from the official reports of institutions or organizations. Other studies may classify and evaluate the contents of documents according to established criteria. The frequency of appearance or the proportion of space occupied may provide a basis for the analysis of other data.

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[22] W. W. Charters and Douglas Waples, *The Commonwealth Teacher Training Study* (Chicago: The University of Chicago Press, 1929).

It is well to remember that the emphasis in documentary materials is not always accurately evaluated by frequency of appearance or quantity of space occupied. The aspect of intensity through the use of prominence of position or emotionally loaded terms may well lend emphasis in ways quite unrelated to quantity alone.

In using documentary sources, one must bear in mind the fact that data appearing in print are not necessarily trustworthy. The evaluation of documents used in descriptive research must be subjected to the same careful type of criticism employed by the historian. Not only is the authenticity of the document important, but the validity of its contents is crucial. The burden of proof lies with the researcher. It is his obligation to establish the trustworthiness of all data that he draws from documentary sources.

In documentary analysis the following may be used as sources of data: official records and reports, printed forms, textbooks, reference books, letters, autobiographies, diaries, compositions, themes or other prepared work, books, magazines, newspapers, college bulletins or catalogues, syllabi or courses of study, pictures, films, and cartoons.

The following purposes may be served through documentary analysis: (Examples of actual studies are given as illustrations.)

1. To describe prevailing practices or conditions.

   Entrance Requirements of Ohio Colleges as Revealed by an Analysis of College Bulletins.

   Criteria for Primary Pupil Evaluation Used on Marion County Report Cards.

2. To discover the relative importance of, or interest in, certain topics or problems.
   Public Information on Education as Measured by Newspaper Coverage in Three Indianapolis Daily Newspapers during the Month of December, 1958.
   Statistical Concepts Presented in College Textbooks in Educational Research, Published since 1940.
3. To discover level of difficulty of presentation in textbooks or in other publications.
   The Vocabulary Level of Intermediate Science Textbooks.
   Abstract Concepts Found in First Grade Readers.
4. To evaluate bias, prejudice, or propaganda in textbook presentation.
   The Soviet Union as Presented in High School History Textbooks.
   The Free Enterprise System as Pictured in High School Social Problems Textbooks.
   Racial and Religious Stereotypes in Junior High School Literature Textbooks.
5. To analyze types of errors in students' work.
   Typing Errors of First Semester Typing Students at Shortridge High School.
   Errors in English Usage Found in Letters of Application for Admission to the University of Wisconsin.
6. To analyze the use of symbols representing persons, political parties or institutions, countries, or points of view.
   Great Britain as a Symbol, As Represented in New York City Newspaper Cartoons in the Decade, 1930–1940.
   The New Dealer as Depicted in the American Press from 1932 to 1942.
7. To identify the literary style, concepts, or beliefs of a writer.
   Shakespeare's Use of the Metaphor.
   Alexander Campbell's Concept of the Trinity, as Revealed in His Sermons.
   John Dewey's Interpretation of Education as Growth.

Content or document analysis should serve a useful purpose in research, adding important knowledge to a field of study, or yielding information that is helpful in evaluating and improving social or educational practices. Since there are so many significant areas of knowledge to be investigated, setting up studies for the pure joy of counting and tabulating has little justification. Such investigations as "The Uses of Shall and Will in the Spectator Papers," or "The Use of Too, Meaning Also, in the Works of Keats," would seem to add little useful knowledge to the field of English literature.

THE FOLLOW-UP STUDY

The follow-up study investigates individuals who have left an institution after having completed a program, a treatment, or a course of study. The study is concerned with what has happened to them, and what has been the impact of the institution and its program upon them. By examining their status or seeking their opinions, one may get some idea of the adequacy or inadequacy of the institution's program. Which courses, experiences, or treatments proved to be of value? Which proved to be ineffective or of limited value? Studies of this type enable an institution to evaluate various aspects of its program in light of actual results.

Dillon's [23] study of early school leavers has yielded information that may lead to the improvement of the curriculum, guidance services, administrative procedures, and thus the holding power of the American secondary school.

Seagoe [24] has conducted follow-up studies of candidates for teaching who were judged to be poor candidates while they were undergraduate students at the University of California. These studies may provide valuable information on the process of selection and recommendation of candidates for teaching, and the prediction of teaching success prior to service.

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[23] Harold J. Dillon, *Early School Leavers*, Pub. #401 (New York: National Child Labor Committee, 1949).

[24] May V. Seagoe, "A Follow-Up Study of 314 Students Whose Fitness for Teaching Was Questioned." *Journal of Educational Research*, 50:9, May 1957, pp. 641–53.

Terman and Oden[25] restudied a group of gifted children after a period of twenty-five years. An effort was made to evaluate the influence of giftedness upon their status as adults, and upon their contribution to society.

Havemann and West[26] have made a follow-up study of almost 10,000 college graduates. Graduates of over one thousand colleges were studied. Significant data were gathered on their occupations and incomes, family life, social and community service activities, and their outlook on political, social, and economic issues.

TREND STUDIES

The trend, or predictive, study is an interesting application of the descriptive method. In essence, it is based upon a longitudinal consideration of recorded data, indicating what has been happening in the past, what the present situation reveals, and on the basis of these data, what will be likely to happen in the future. For example, if the population in an area shows consistent growth over a period of time, one might predict that by a certain date in the future the population will reach a given level. These assumptions are based upon the likelihood that the factors producing the change or growth will continue to exert their influence in the future. The trend study points to conclusions reached by the combined methods of historical and descriptive analysis.

An excellent example of the trend study is presented in *An Economic Portrait of Indiana in 1970: Indiana's Economic Resources and Potential.*[27] In this projection such elements as population, school enrollments at various levels, agricultural and industrial production, employment and the labor force, retail sales, electrical energy production, tax revenues, auto registrations, and the Indiana gross product are predicted.

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[25] Louis M. Terman and Melita H. Oden, *The Gifted Child Grows Up: Twenty-five Years Follow-Up of a Superior Group* (Stanford, California: Stanford University Press, 1947).

[26] Ernest Havemann and Patricia West, *They Went to College: The College Graduate in America Today* (New York: Harcourt, Brace and Co., Inc., 1952).

[27] School of Business, Indiana University, *An Economic Portrait of Indiana in 1970: Indiana's Economic Resources and Potential* (Bloomington, Ind.: 1956).

This type of study furnishes valuable data for planning programs, in whatever area they may be. Of course, such predictions are estimates, representing tentative conclusions only. Wars, economic recessions, great technological discoveries, and many other unforeseen events could hasten or arrest the processes of growth or development.

The President's Commission on Higher Education[28] has used the process of trend analysis to forecast the doubling of college enrollments by 1970. These trends have important implications for college officials, who must find ways of providing buildings and equipment, teaching staff, and financial support for a greatly expanded program of higher education. Basing these predictions on an ever-increasing number of secondary-school graduates, and the constantly increasing proportion of graduates who continue their education, the Commission anticipates that a flood of young people will be knocking at college and university doors in coming years.

SUMMARY

Descriptive research, the predominate research method of the behavioral sciences, is concerned with prevailing conditions. In addition to description there is an element of interpretation of the meaning or significance of what is described. Knowledge of present status is a necessary first step in problem-solving. Descriptive research may also be used to identify goals or objectives and the ways in which they may be reached.

The survey gathers data from a relatively large number of cases at a particular time. The survey method is applied to the analysis of existing social conditions, including educational conditions, and to the analysis of public opinion.

The case study gathers data more intensively from a single case or from a limited number of typical cases. It is concerned with the life history, or an important part of the life history, of a particular case. It is concerned with change or growth over a period of time. Communities, types of individuals, social groups, or institutions may be considered as cases for analysis.

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[28] *Second Report to the President; President's Committee on Education Beyond the High School* (Washington: July, 1957).

Causal comparative studies analyze the relationships between factors that may help to explain why certain conditions prevail. Activity analysis describes the nature of the processes involved in a job or an activity. Time-and-motion studies represent a more intensive analysis of the actual body movements involved in a process or operation. Document analysis examines the content of written or printed materials as a source of data. The follow-up study investigates the influence that a course of study, a process, or an institution has had upon an individual or a group of individuals. Trend, or predictive, studies, by a careful analysis of past events and present conditions, attempt to predict conditions that are likely to prevail in the future.

Descriptive research involves more than fact-gathering and tabulation. It deals with the analysis and interpretation of the data which have been gathered for a specific purpose, for the understanding and solution of significant problems.

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6

EXPERIMENTAL RESEARCH

EXPERIMENTAL RESEARCH IS THE DESCRIPTION AND analysis of what will be, or what will occur, under carefully controlled conditions. It is the classical methodology of the science laboratory, and is probably the most difficult and most exacting of all methods of research. While experimental research finds its greatest utility and application in the laboratory, where conditions can be rigorously controlled, it has been applied with some success in the school classroom where, within certain limits, significant factors or conditions can be controlled.

The basic assumption of experimental research rests upon what is known as the law of the single variable. John Stuart Mill defined this principle in 1872 in his rules or canons: [1]

> If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur have every circumstance in common save one, that one occurring only in the former, the circumstances in which alone the two instances differ is the effect, or the cause, or an indispensable part of the cause, of the phenomenon.

In more simple language, if two situations are alike in every respect, and one element is added to one but not to the other, any difference that develops is the result of the operation of that element added. Or, if two situations are alike in every respect, and one element is removed from one but not from the other, any difference that develops may be attributed to that element subtracted.

LABORATORY RESEARCH

The law of the single variable has always provided the basis for laboratory experimentation. In 1662 Robert Boyle, an Irish physicist, used this methodology in arriving at the principle on which he formulated his law of gases. He discovered that when the temperature is held constant, the volume of an ideal gas is halved when the pressure is doubled, and doubled when the pressure is halved, etc. Thus, at constant temperature, the volume of an ideal gas is inversely proportional to the pressure exerted upon it.

$$\frac{V_1}{V_2} = \frac{P_2}{P_1} \text{ (In Boyle's Law pressure is the single variable.)}$$

A little more than a century later, Jacques A. C. Charles, a French physicist, discovered a companion principle, now known as Charles'

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[1] John Stuart Mill, *A System of Logic* (New York: Harper & Brothers, 1873), p. 222.

Law. He observed that when the pressure is held constant, the volume of an ideal gas is directly proportional to the temperature.

$$\frac{V_1}{V_2} = \frac{T_1}{T_2}$$ (In Charles' Law temperature is the single variable.)

In the psychological laboratory significant experiments have been conducted investigating the nature of instinct, reflex habit, motivation, memory, transfer of training, and other aspects of behavior. Using as subjects rats, dogs, cats, chickens, guinea pigs, and apes, such stimuli as hunger, pain, color, electric shock, and noise have been introduced as variables. Many basic principles of behavior have been discovered, many of them applicable to the interpretation of human behavior.

MEDICAL RESEARCH

In many situations involving human beings the principle of the single variable has been effectively employed. During World War II, the Commission on Medical Research of the Office of Scientific Research and Development was interested in discovering the effectiveness of certain seasickness remedies. A staff of researchers from the California Institute of Technology, under the direction of Dr. David Tyler, carried on a series of 90 experiments over a period of six months,[2] using over 20,000 service men as subjects, chosen at random from a population of over 100,000. Various medical preparations were tested. The most effective was a compound made up of a barbiturate and a belladonna derivative.

To one experimental group of men on troop transports and on various types of landing craft, regular dosages of the drug were administered. To another group, a harmless powder (known as a placebo) was administered. No medication was given to the third (or control) group. It was discovered that the group having no medication suffered most. Those receiving the placebo suffered only a trifle less incidence of nausea (1 per cent less than the control group, while those who received the drug suffered from 40 per cent to 80 per cent less. Its use also improved rifle marksmanship after landing by 12 per cent.

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[2] "Seasickness Drug," *Business Week*, #857, February 2, 1946, p. 57. By special permission, copyrighted © 1946 by McGraw-Hill Publishing Co., Inc.

This series of experiments, based upon the law of the single variable, proved the effectiveness of the drug in combatting seasickness. The placebo was administered to discount the psychological effect that a harmless powder would have. Any treatment, even though of no recognized medical value, seems to exert some helpful psychological effect on a subject. The effectiveness of the medication is then measured by its superiority over the placebo, thus subtracting the purely psychological factor from the experiment.

On the week of April 26, 1954, an experiment was conducted involving 1,830,000 children in every part of the United States which had a high poliomyelitis rate. Using the Salk vaccine as an experimental factor, three intramuscular innoculations of 1 cc. each were administered to 440,000 children, with the second and third innoculations coming one week and five weeks after the first, respectively.[3] A saline solution, or placebo, was administered to another group of 210,000 children, while a third group of 1,180,000 children was designated as a control group and received no medication.

After a period of time the records of the three groups were analyzed. The experimental group receiving the Salk vaccine had a far more favorable record. In spite of the fact that many children might have received the vaccine too late to be completely effective, only fifty-seven developed symptoms of poliomyelitis and only one died. In the words of Dr. Thomas D. Dublin,

> It is almost universally known that this basically medical test—unprecedented in its objectives, its magnitude, and its scope, has been highly successful, and there is now available to the public a safe and simple measure offering 60–90 per cent protection against paralytic poliomyelitis.[4]

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[3] Thomas D. Dublin, "1954 Poliomyelitis Field Trial," *Journal of American Medical Association*, 158:14, August 6, 1955, pp. 1258–1265. Used with permission.

[4] *Ibid.*, p. 1265.

The Salk vaccine was the single variable, and the reduction of the incidence of poliomyelitis was ascribed to its use.

In the two medical experiments mentioned there was no effort made to keep all variables constant. The groups were selected by a type of random selection. What variables existed were considered relatively unimportant to the testing of the hypothesis that the given medicine would be effective in the prevention of the illness. Thus, we find what might be called a modification of the law of the single variable, the law of the only significant variable; the medication was the only significant factor among many others that undoubtedly existed.

CLASSROOM RESEARCH

In bringing the experimental method of research into the school classroom, complex human beings are the subjects, and it is unlikely that all variables could ever be controlled. Most classroom experiments have attempted to eliminate one or more of the variables of age, achievement, intelligence, and sometimes such variables as reading ability, socio-economic status, and race. But since the organization of the typical school cannot justifiably be rearranged for the purpose of experimentation, most experiments must be conducted using intact, existing class groups, trusting that the variables not controlled are irrelevant, or would not seriously alter the results obtained. It is clear that there are, however, countless factors that can and do influence teaching-learning situations at a particular time; factors affecting both teacher and pupil. A few of these difficult- or impossible-to-control variables are:

1. Teacher enthusiasm for a particular method or material.
2. Teacher competence in a particular method or with a particular material.
3. Regularity of attendance.
4. Mental or emotional state of the child. An unfavorable condition may result from indigestion, a cold or fever, quarrel with a friend, lack of sleep the previous night, family disharmony at the breakfast table, poor breakfast, unsuccessful experience with a test the previous period, concern about an important after-school activity, personal relationship with the teacher, and other factors too numerous and too complex to control.

This recital of less-than-perfect experimental conditions is not intended to deprecate the classroom experiment. With all of its limitations, the process of experimental research in the classroom has some merit, even though the rigorous controls of the science laboratory cannot be maintained.

CLASSROOM RESEARCH METHOD

Research in the classroom has usually endeavored to establish as the significant variable a teaching method, the use of a particular teaching material, or an administrative arrangement such as class grouping, seating arrangement, or some physical feature of the classroom.

The pattern involves a comparison of the effectiveness of a new method, arrangement, or device—known as the experimental factor—with the customary method or device—the control factor. The criterion is usually pupil growth in skills and knowledge, which can be measured by some type of testing program. The process can be illustrated by a simple diagram.

Experimental Group	Control Group
1. Pretest	1. Pretest
2. Application of experimental factor	2. Application of control factor
3. Final test	3. Final test
4. Measure pupil mean gain (Final test scores minus pretest scores)	4. Measure pupil mean gain (Final test scores minus pretest scores)

The difference between the control pupil mean gain and the experimental pupil mean gain would indicate the relative superiority of the method or factor showing the greatest pupil gain.

It is important to note that in addition to controlling all of the variables except the method used, another difficult problem confronts the classroom experimenter. Educators are generally aware of the difficulty of devising tests or measuring instruments that accurately measure the amount of pupil gain. To measure the acquisition of limited facts and information is fairly feasible, but to measure all of the important products of learning is much more difficult. It is obvious that the satisfactory measurement of pupil gain in a classroom experiment presumes that the tests used have a high degree of validity and reliability. Without tests that really measure the products of learning that are important, and that consistently produce equivalent scores, classroom experimentation of this type can produce no usable evidence. Developing tests of satisfactory validity and reliability is one of the most important phases of the research problem.

PATTERNS OF CLASSROOM RESEARCH

1. Single individual or single group.
2. Parallel, equated groups (two or more).
    a) Equated by random sample.
    b) Equated by mean scores.
    c) Equated by matched pairs.
    d) Co-twin method.
3. Rotational method.
    a) Single group.
    b) Parallel, equated groups.

1. Single individual or single group

This type of experiment is carried on with one individual or one group of individuals. Since the discussion here deals with research in the classroom, the single group experiment is described. This type is probably the easiest to manage, for it requires little or no tampering with intact, existing classes. The same students are used throughout the experiment, and their achievement under one condition is compared with their own achievement under another condition rather than with the achievement of another group.

The process consists of pretesting the group, teaching a unit of work by a conventional (control) method, and final testing and measurement of the pupil average or mean gain. Then, a different unit of work is started with a pretest. After the experimental teaching method is applied, a final test is given and the mean pupil gain is computed. The pupil mean gain for the control unit is compared with the pupil mean gain for the experimental unit. A judgment is then made on the basis of which of the methods, control or experimental, produced the greatest pupil mean gain.

In choosing units of work for single group experiments it is very important that:

1. The units of work be of equal difficulty.
2. The units be equally interesting.
3. An equal amount of time be allowed for each unit.
4. The tests produce scores of equal scale value.

Upon first examination it would seem that the single-group method might provide an almost ideal way of controlling all of the variables except one, the teaching method employed. Closer examination, however, reveals many variables that remain and that cannot easily be controlled.

1. The teacher may have more competence in, or enthusiasm for, one of the methods.
2. The second phase of the one group experiment involves students who are a little older and a little more mature than they were when they entered the first phase.
3. Certain learnings and techniques of learning resulting from the first unit may have been carried over to the second, influencing the amount of pupil gain. Even the practice effect of the particular type of tests used might produce some advantage accruing to the method of the second phase.
4. The novelty of any new method might produce greater gain, regardless of its real merit.

II. Parallel, equated groups (two or more)

Some, but not all, of these limitations can be avoided by using the method of carrying on the teaching methods simultaneously in parallel, equated groups. The problem here is equating the groups, or getting groups that are as nearly equal as possible. There are four ways in which groups may be equated:

1. *By random selection.* It is assumed that if both groups are selected from a very large population by some system of random

selection, the groups will tend to be about equal in composition. (See Chapter 7, "Sampling.")

2. *By equating on the basis of mean scores and standard deviations.* This method would involve the selection of groups whose mean ages, intelligence scores, and other factors considered significant were about the same. The equating of variations from the mean would also be necessary in order to assume that the groups were about equal in homogeneity.

3. *By matched pairs.* This method involves finding pairs of students whose characteristics are as nearly alike as possible—age, sex, intelligence, home background, race, and others. Then one of the pair is assigned to the control group and the other to the experimental group. On the assumption that sums of equals are equal, the two groups would be equated, thus eliminating most of the variables except the method under investigation.

4. *By co-twin method.* This method separates pairs of identical twins, placing one in the control group and the other in the experimental group. While this method has been used with some success in studying the relative influence of heredity and environment with limited numbers of children, it is not feasible for most class room experiments. In most school systems it would be practically impossible to find enough pairs of identical twins at any grade level to make such grouping possible, to say nothing of the administrative problems of setting up such equated groups.

The limiting factors of the parallel-equated-group method of experimental research have already been implied. The difficulty of equating groups, the tremendous administrative problems involved in reorganizing classes, the ever-present element of teacher competence and enthusiasm, and the problem of satisfactory validity and reliability of the measuring instruments are all difficult elements for the researcher to handle.

Three-group design

For purposes of simplicity of explanation, up to this point two parallel groups have been described, a control group and an experimental group. Another pattern of experimental design provides for three parallel, equated groups operating simultaneously. In addition to the control group and the experimental group a third group is set up, using some variation of the experimental factor.

An example of this procedure is illustrated by an experiment, conducted at San Francisco State College, that was designed to evaluate the effectiveness of the teaching of college courses by television. Dr. Thomas P. Lantos, operating with a Ford Foundation grant, taught a course in "The American Economy" to three groups of carefully matched college sophomores.

One group was taught by the conventional class-lecture method. A second group listened to the semiweekly lectures via closed-circuit television, also in a campus classroom, having no way to escape the lectures except by daydreaming. The third group stayed at home and viewed the lectures on their own television sets, and were free to listen or pass up the lecture as they wished.

All groups participated in a weekly on-campus class discussion, used the same textbooks, took the same examinations, and had the same instructor. Dr. Lantos reports that preliminary evaluation of these tests and examinations showed no significant differences among the three groups.[5]

III. Rotational methods

The third pattern of experimental design is applicable to, and presents a variation of, both individual and parallel-equated-group methods. It involves rotating the order of procedures or of groups.

As applied to the single group method, it would involve changing the time sequence of the control and experimental units presented. *Cycle I* would present the control method first, then the experimental method.

Cycle II would present the experimental method first, then the control method.

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[5] Thomas P. Lantos, "A Professor Converts to the Electronic Age," *The Reporter*, 16:13, May 30, 1957, p. 15 Used with permission.

As applied to parallel, equated groups:

Cycle I: Group A–experimental method
Group B–control method
Cycle II: Group A–control method
Group B–experimental method

If a particular teaching method consistently produced superior pupil gain, no matter in what order or to which group it was applied, its superiority would be confirmed with much greater confidence. This technique of rotation would tend to minimize the influence of uncontrolled factors and to provide a more convincing test of the superiority of the particular method under investigation.

In concluding the discussion of the experimental method in classroom research, several points should be emphasized:

1. Since the public schools do not exist for the purpose of experimentation, the administrative difficulties of manipulating individuals and groups for such ends often preclude the possibility of applying some of the techniques described.

2. Experimental research conclusions cannot be applied generally outside the specific group or groups studied, unless the groups have been carefully composed of individuals chosen at random from a large population. The type of experimental design that involves sampling procedures and the interpretation of statistical data resulting from these procedures calls for an expertness that few classroom teachers possess.[6]

3. At several points in the discussion attention has been called to the difficulty of achieving control over the many variables that are present in the school classroom. Many statistical techniques have been developed to handle several variables simultaneously in the experimental situation. Such devices as random blocks, Latin Squares, analysis of variance and co-variance, partial and multiple correlation, and other procedures are quite technical and beyond the scope of a general treatment of research. Satisfactory

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[6] See discussion of descriptive and inferential statistics in Chapter 7.

explanations may be found in most advanced textbooks in educational statistics.

4. It should be remembered that the effectiveness of teaching-learning in any classroom situation can rarely be attributed to a single factor. Thus, even though the single variable might be successfuly isolated, great caution should be exercised in interpreting the resulting experimental conclusions.

5. It is possible that setting up a carefully controlled experiment in the classroom might result in an artificial teaching-learning situation. Consequently, the conclusions based upon such conditions may have limited relevancy for more normal classroom situations and procedures.

6. Since the conclusions derived from classroom experiments are usually based upon test results, the researcher should be cautious about the use of nonstandardized, teacher-made tests. If possible, there should be employed a variety of standardized instruments which validly and reliably measure those broad products of learning which a sound philosophy of education recognizes as important.

On the more positive side of the evaluation of experimental research in the classroom, several additional points may be noted:

1. For most classroom teachers, an action-type research investigation should prove most satisfactory. Since the superiority of an experimental teaching method may prove to be convincing, common sense would suggest its use, without the need for elaborate tests of statistical significance, provided that there is no presumption of its superiority for other groups in other situations.

2. Many large school systems have research departments and highly qualified research personnel who may justifiably carry on more pretentious experiments, under carefully controlled conditions, and using the best statistical techniques of control and interpretation. It is important to the development of education as a profession that these inferential studies be conducted by qualified experts.

3. Teachers who experiment in their classrooms, even modestly, tend to grow in teaching skill. The mere process of setting up a study, carefully planning procedures, attempting to control factors, and accurately evaluating results of new teaching methods is con-

ducive to the improvement of the teaching-learning process, as well as the professional growth of the experimenter. Good administrators and consultants encourage this type of activity.

Those who engage in, and publish the results of, educational experiments are expected to define the problem carefully, to explain all basic assumptions, to define all necessary terms, and to describe in detail all procedures and all measuring devices used for evaluation. Only with this information can other students of research evaluate the conclusions and the worth of the research project.

SUMMARY

Experimental research describes *what will be* when all relevant conditions are carefully controlled. The basic assumption of the experimental method rests upon the *law of the single variable* described by John Stuart Mill in his laws, or canons. In brief, the law of the single variable states that if two situations are alike in every respect, and one element is added to one but not to the other, any difference that results is the effect of the operation of the added element. Or, if two situations are alike in every respect, and one element is removed from one but not from the other, any difference that results may be attributed to the subtracted element.

Although the experimental method has traditionally been the method of the science laboratory, where conditions can be rigorously controlled, social scientists have attempted to carry it to the field, where more lifelike conditions prevail. In the classroom the experimental method may contribute to the improvement of educational practices. While it is admittedly difficult to control all of the many factors that influence the teaching-learning situation, classroom experiments have been successfully conducted.

A comparison of the effectiveness of an experimental teaching method with that of a control method may be made by applying each procedure, and then measuring pupil mean gain by scores on carefully designed achievement tests. If all significant factors except the specific teaching procedures can be held constant, the method producing the greater amount of pupil mean gain may be presumed to be the more effective.

Experimental designs may be established on the basis of a single individual, a single group, or two or more parallel, equated groups. Groups may be equated by means of random selection, by equalizing mean scores and standard deviations, by selecting matched pairs, or by the co-twin method. Varying the order of application of the experimental and the control factors, known as the rotational method, may provide a more convincing test of the superiority of one teaching method over the other.

Classroom teachers need to know the limiting factors that are inherent in classroom teaching-learning experiments. As a result of engaging in classroom experiments, teachers are likely to grow both in teaching skill and in professional spirit and awareness.

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7

THE TOOLS OF RESEARCH

TO CARRY OUT ANY OF THE TYPES OF RESEARCH investigation described in the three preceding chapters, data are gathered from which the hypothesis may be tested. A great variety of research tools has been developed to aid in the acquisition of data. These tools are of many kinds and employ distinctive ways of describing and quantifying the data. Each tool is particularly appropriate for certain sources of data, yielding information of the kind and in the form that would be most effectively used.

Some of these devices merely identify the presence or absence of certain aspects of a situation. Others collect qualitative descriptions, which may involve comparisons or contrasts between elements present in the situation. Other devices yield quantitative measures in scale measures or in scores. This measurement of what is identified adds an important dimension to description; not only *what,* but *how much,* is revealed.

To say that it was a hot day yesterday and that it rained hard involves description. But to say that the temperature reached 93° Fahrenheit at 3:00 P.M., and that an inch of rain fell between 4:00 and 6:00 P.M., quantifies the description, adding a much more precise element.

Many of the tools of research have been designed to yield quantitative measures. Others yield description that may be refined by counts of frequency of appearance. A visitor may observe that a number of children wear glasses in Room A, and that fewer children seem to wear them in Room B. A frequency count might verify the observation. Eight bespectacled students of thirty-two in Room A would indicate that 25 per cent wear glasses. Three students wearing glasses of thirty in Room B would indicate a percentage of ten. Thus, the observation is more precisely stated by a frequency count and a percentage comparison.

This quantification of data is an essential part of research. While some judgments cannot be expressed in frequency counts, percentages, or scores, most data are made more meaningful by quantification. In addition to frequency counts and percentage or fractional comparisons, data may be refined by numerical ratings, rank-order placement, paired comparisons, social-distance scales, equal-appearing intervals, summated ratings, and standardized score values. A number of these scaling procedures are described later in this section.

Many writers have argued the superiority of the interview over the questionnaire, or the psychological test over the interview. It is difficult to see merit in this approach. Dr. A. S. Barr, a University of Wisconsin teacher and researcher, would resolve discussions of this sort by asking, "Which is better, a hammer or a handsaw?"

Like the tools in the carpenter's box, each research tool is appropriate in a given situation to accomplish a particular purpose. Each data-gathering device has both merits and hazards or limitations.

Many research investigators use a variety of these devices in gathering the data necessary for the testing of the hypothesis. Students of research should familiarize themselves with the advantages and limitations of each device. They should attempt to develop skill in the construction and use of each of these useful tools.

INQUIRY FORMS

The term *inquiry form* is a general classification of data-gathering devices in which the data are obtained from the respondent in written form. When the form is filled out in the presence of the questioner, it is usually referred to as a schedule. When it is administered by mail, it is referred to as a questionnaire. When its purpose is to gather opinions rather than facts, it is often known as an "opinionnaire" or attitude scale.

The schedule

Schedules administered personally to groups of respondents have several advantages. The opportunity to establish rapport, to explain the purpose of the investigation, and to explain the meaning of items that may not be clear, the availability of respondents, and the economy of time and expense are all advantages that a questionnaire administered by mail cannot provide. In addition, the schedule type may provide almost all complete and usable returns. It is likely that a principal would get completely usable responses from the teachers in his building. A teacher should obtain complete returns on schedules administered to students in the classroom.

However, individuals who have the desired information cannot always be contacted personally, either for an interview or for the completing of a personally administered schedule. There are times when a personal contact would be too expensive or time-consuming.

It is in these situations that the questionnaire administered by mail makes its contribution as a technique of data-gathering.

The questionnaire

The questionnaire is probably the most used and most abused of the data-gathering devices. Perhaps most criticism has been directed at its misuse rather than at its use. It has been referred to as the lazy man's way of gaining information, although the careful preparation of a good questionnaire takes a great deal of time, ingenuity, and hard work. There is little doubt that the poorly constructed questionnaires that flood the mails have created a certain amount of contempt. Particularly is this true when the accompanying letter pleads that the sender needs the information to complete the requirements for a graduate course, a thesis, or a dissertation. The recipient's reaction may be, "Why should I go to all this trouble to help this person get his degree?"

Filling out lengthy questionnaires takes a great deal of time and effort, a favor that few senders have any right to expect of strangers The unfavorable reaction is intensified when the questionnaire is long, the subject trivial in importance, the items vaguely worded, and the form poorly organized. The unfavorable characteristics of so many questionnaires help to explain why so small a proportion of questionnaires sent out by mail are returned. As a result of this sparse response, the data that are obtained are often of limited validity. The information in the unreturned questionnaires might have changed the results of the investigation materially. The very fact of no response might imply certain types of reaction, reactions that can never be included in the summary of data.

Unless one is dealing with a group of respondents who have a genuine interest in the problem under investigation, who know the sender, or who have some common bond of loyalty to a sponsoring institution or organization, the results are frequently disappointing, and provide a flimsy basis for generalization.

While the foregoing discussion may have seemed to discredit the questionnaire as a respectable research technique, the attempt has been to consider the abuse or misuse of the device. Actually, the questionnaire has unique advantages and, properly constructed and administered, it may serve as a most appropriate and useful data-gathering device in a particular research project.

The closed form

Questionnaires that call for short, check responses are known as the restricted or closed-form type. They provide for marking a *yes* or *no*, a short response, or checking an item from a list of suggested responses. The following example illustrates the closed-form item:

> Why did you choose to do your graduate work at this university? Kindly indicate three reasons in order of importance
>
> Rank
>
> a) Convenience of transportation ________
> b) Advice of a friend ________
> c) Reputation of institution ________
> d) Expense factor ________
> e) Scholarship aid ________
> f) Other ____________________ ________
> (Kindly specify)

Even when using the closed form, it is well to provide for unanticipated responses. Providing an "other" category permits the respondent to indicate what might be his most important reason, one that the questionnaire builder had not anticipated. Note the subtitle "(Kindly specify)," which enables the tabulator to properly classify all responses.

For certain types of information the closed-form questionnaire is entirely satisfactory. It is easy to fill out, takes little time, keeps the respondent on the subject, is relatively objective, and is fairly easy to tabulate and analyze.

The open form

The open-form or unrestricted type of questionnaire calls for a free response in the respondent's own words. The following open-form item would seek the same type of information sought in the previous closed-form item:

State the reasons why you chose to take your graduate work at this university.

Note that no clues are provided. The open form probably provides for greater depth of response. The respondent reveals his frame of reference and possibly the reasons for his responses. This type of item, however, is sometimes difficult to interpret, tabulate, and summarize in the research report.

Many questionnaires include both open- and closed-type items. Each type has its merits and limitations, and the questionnaire builder must decide which type is more likely to supply the information he wants.

IMPROVING QUESTIONNAIRE ITEMS

Inexperienced questionnaire makers are likely to be naive about the clarity of their questions. The author recalls a brilliant graduate student who submitted a questionnaire for the professor's approval. She seemed somewhat irritated and impatient at the subsequent questions and suggestions, and remarked that anyone with any degree of intelligence should know what she meant. At the advisor's suggestion she duplicated some copies and personally administered the questionnaire to a graduate class in research.

She was literally swamped with questions of interpretation, many that she could not answer clearly. There was considerable evidence of confusion about what she wanted to know. After she had collected the completed questionnaires and had tried to tabulate the responses, she began to see the light. Even her directions and explanation in class had failed to clear up the intent of her ambiguous questionnaire. Her second version was a much-improved instrument.

Many beginning researchers aren't really sure what they want to know. They use a shotgun approach, attempting to cover their fied broadly in the hope that some of the responses will provide the answers for which they are groping. Unless the researcher knows exactly what he wants, however, he is not likely to ask the right questions, or to phrase them properly.

In addition to the problem of knowing what he wants, there is the difficulty of wording the questionnaire clearly. The limitations of words are particular hazards in the questionnaire. The same words mean different things to different people. The questionnaire maker has his interpretation—the respondents may have many different interpretations. In the interview, or in conversation, we are able to clear up misunderstanding by restating our question, by inflection of the voice, by suggestions, and by a number of other devices. But the written question stands by itself, often ambiguous and misunderstood.

A simple example illustrates the influence of voice inflection alone. Consider the following question. Read it over each time, accenting the word that is underlined, noting how the change in inflection alters the meaning.

Were you there last night?
Were you there last night?
Were you there last night?
Were you there last night?
Were you there last night?

The questionnaire maker must depend on words alone. It is apparent that he cannot be too careful in phrasing questions to insure their clarity of purpose. While there are no certain ways of producing fool-proof questions, there are principles that might be employed to make items more precise. A few are suggested here, with the hope that students constructing questionnaires will become critical of their first efforts and strive to make each question as clear as possible.

1. Define or qualify terms that could easily be misinterpreted.

What is the value of your house?

The meaning of the term *value* is not clear. It could mean the assessed value for tax purposes, what it would sell for on the present market, what you would be willing to sell it for, what it would cost to replace, or what you paid for it. These values may differ considerably. It is essential to frame specific questions such as, "What is the present market-value of your house?"

As simple a term as *age* is often misunderstood. When is an individual twenty-one? Most people would say that a person is twenty-one from the day of his twenty-first birthday until the day of his twenty-second. An insurance company would consider him twenty-one from the twenty-year, six-months date until the twenty-first-year, six-months date. Perhaps this question could be clarified by asking *age to nearest birthday,* or *date of birth.*

There are hundreds of words that are ambiguous because of their many interpretations. One has only to think of such words and phrases as curriculum, democracy, progressive education, cooperation, and integration—even such simple words as *how much* and *now.* To the question, "What work are you doing now?" the respondent might be tempted to answer, "Filling out your foolish questionnaire."

2. Be careful in using descriptive adjectives and adverbs that have no agreed-upon meaning. This fault is frequently found in rating scales as well as in questionnaires. *Frequently, occasionally,* and *rarely* do not have the same meanings to different persons. One respondent's *occasionally* may be another's *rarely.* Perhaps a stated frequency—*times per week, times per month*—would make this classification more precise.

3. Beware of double negatives.

> Are you opposed to not requiring students to take showers after gym class?
>
> Federal aid should not be granted to those states in which education is not equal regardless of race, creed, or color.

4. Be careful of inadequate alternatives.

> Married? Yes______ No______.

Does this question refer to present or former marital status? How would the person answer who is widowed, separated or divorced?

> How late at night do you permit your children to watch television?

There may be no established family policy. If there is a policy, it may differ for children of different ages. It may be different for school nights, or for Friday and Saturday nights when the late, late show may be permitted.

5. Avoid the double-barreled question.

> Do you believe that gifted students should be placed in separate groups for instructional purposes and assigned to special schools?

One might agree on the advisability of separate groups for instructional purposes, but be very much opposed to the assignment of gifted students to special schools. Two questions are needed.

6. Underline a word if you wish to indicate special emphasis.

> Should all schools offer a modern foreign language?

7. When asking for ratings or comparisons a point of reference is necessary.

> How would you rate this student teacher's classroom teaching?
> Superior________ Average________ Below Average ________

With whom is the student teacher to be compared—an experienced teacher, other student teachers, former student teachers —or should the criterion be what a student teacher is expected to be able to do?

8. Avoid unwarranted assumptions.

> Are you satisfied with the salary raise that you received last year?

A "no" answer might mean that I didn't get a raise, or that I did get a raise, but I'm not satisfied.

> Do you feel that you benefitted from the spankings that you received as a child?

A "no" response might mean that the spankings did not help me, or that my parents did not administer corporal punishment. These unwarranted assumptions are nearly as bad as the classic, "Have you stopped beating your wife?"

9. Phrase questions so that they are appropriate for all respondents.

> What is your monthly teaching salary?

Some teachers are paid on a nine-month basis, some ten, some eleven, and some twelve. Three questions would be needed.

> Your salary per month? ________.
> Number of months in school term? ________.
> Number of salary payments per year? ________.

10. Design questions that will give a complete response.

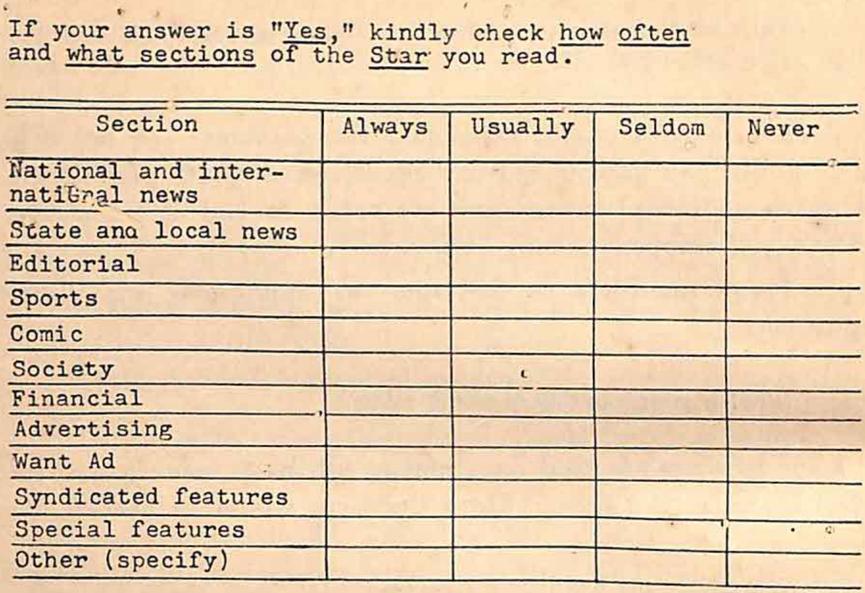
> Do you read the *Indianapolis Star*? Yes_______ No_______.

A "yes" or "no" answer would not reveal much information about the reading habits of the respondent. The question might be followed with an additional item, as in Fig. 7-1.

11. Provide for the systematic quantification of responses. One type of question that asks respondents to check a number of items from a list is difficult to summarize, especially if all respondents do not check the same number. One solution is to ask respondents to rank, in order of preference, a specific number of responses.

> What are your favorite television programs? Rank in order of preference your first, second, third, fourth, and fifth choices.

The items can then be tabulated by inverse weightings.



If your answer is "Yes," kindly check how often and what sections of the Star you read.

Section	Always	Usually	Seldom	Never
National and international news				
State and local news				
Editorial				
Sports				
Comic				
Society				
Financial				
Advertising				
Want Ad				
Syndicated features				
Special features				
Other (specify)				

Fig. 7-1.

1st Choice	5 Points
2nd Choice	4 Points
3rd Choice	3 Points
4th Choice	2 Points
5th Choice	1 Point

The relative popularity of the programs could be described for a group in terms of total weighted scores, the most popular having the largest total.

12. Consider the possibility of classifying the responses yourself, rather than having the respondent choose categories. If a student were asked to classify his father's occupation in one of the following categories, the results might be quite unsatisfactory.

Unskilled labor ____________
Skilled labor ____________
Clerical work ____________
Managerial work ____________
Profession ____________
Proprietorship ____________

It is likely that by asking the child one or two short questions about his father's work, it could be classified more accurately.

1. At what place does your father work?
2. What kind of work does he do?

The student should bear in mind these few suggestions in constructing questionnaire items. There is no recipe or set of easy directions. It is a difficult job, one that requires a great deal of hard work, imagination, and ingenuity.

CHARACTERISTICS OF A GOOD QUESTIONNAIRE

1. It deals with a significant topic, a topic the respondent will recognize as important enough to warrant spending his time in completing. The significance should be clearly and carefully stated on the questionnaire, or in the letter that accompanies it.

2. It seeks only that information which cannot be obtained from other sources such as school reports or census data.

3. It is as short as possible, only long enough to get the essential data. Long questionnaires frequently find their way into the wastebasket.

4. It is attractive in appearance, neatly arranged, and clearly duplicated or printed.

5. Directions are clear and complete, important terms are defined, each question deals with a single idea, all questions are worded as simply and as clearly as possible, and the categories provide an opportunity for easy, accurate, and unambiguous responses.

6. The questions are objective, with no leading suggestions as to the responses desired. Leading questions are just as inappropriate on a questionnaire as they are in a court of law.

7. Questions are presented in good psychological order, proceeding from general to more specific responses. This order helps the respondent to organize his own thinking, so that his answers are logical and objective. It may be well to present questions that create a favorable attitude before proceeding to those that may be a bit delicate or intimate. If possible, annoying or embarrassing questions should be avoided.

8. It is easy to tabulate and interpret. It is advisable to preconstruct a tabulation sheet, anticipating how the data will be tabulated and interpreted, before the final form of the question is decided upon. This working backward from a visualization of the final analysis of data is an important step in avoiding ambiguity in questionnaire form.

If mechanical tabulating equipment is to be used, it is important to allow code numbers for all possible responses to permit easy transference to machine-tabulation cards.

PREPARING AND ADMINISTERING THE QUESTIONNAIRE

1. Get all of the help that you can in planning and constructing your questionnaire. Study other questionnaires, and submit your items for criticism to other members of your class or your faculty, especially to those who have had experience in questionnaire construction.

2. Try out your questionnaire on a few friends and acquaintances. When you do this personally, you may find that a number of your items are ambiguous. What may seem perfectly clear to you may be confusing to a person who does not have the frame of reference that you gained from living with, and thinking about, an idea over a long period of time.

This "dry-run" will be well worth the time and effort that it takes. It may reveal defects that can be corrected before the final form is printed and committed to the mails. Once the instrument has been sent out, it is too late to remedy its defects.

3. Choose respondents carefully. It is important that questionnaires be sent only to those who possess the desired information—those who are likely to be sufficiently interested to respond conscientiously and objectively. A preliminary card, asking whether or not the individual would be willing to participate in the proposed study, is recommended by some research authorities. This is not only a courteous approach, but a practical way of discovering those who will cooperate in furnishing the desired information.

In a study on questionnaire returns See[1] discovered that a greater proportion of returns was obtained when the original request was sent to the administrative head of an organization, rather than directly to the person who had the desired information. It is possible that when a superior officer turns over a questionnaire to a staff member to fill out, there is implied some feeling of obligation.

4. If schedules or questionnaires are planned for use in a public school, asking for the responses of teachers or pupils, it is essential that approval of the project be secured from the principal, who may then wish to secure approval from the superintendent of schools. Schools are understandably sensitive to public relations. One can understand the possibilities of unfavorable publicity that may result from certain types of studies made by individuals not officially designated to conduct research.

School officials may also want to prevent the exploitation of teachers and pupils by amateur researchers, whose activities would require an excessive amount of time and effort in activities not related to the purposes of the school.

5. If the desired information is delicate or intimate in nature, consider the possibility of providing for anonymous responses. The anonymous instrument is most likely to produce objective responses. There are occasions, however, for purposes of classification, when the identity of the respondent is necessary. If a signature is needed, it is essential to convince the respondent that his responses will be held in strict confidence, and that his answers will in no way jeopardize the status and security of his position.

6. Try to get the aid of sponsorship. Recipients are more likely to answer if a person, organization, or institution of prestige has endorsed the project. Of course, it is unethical to claim sponsorship unless it has been expressly given.

7. Be sure to include a courteous, carefully constructed cover letter to explain the purpose of the study. The letter should promise some sort of inducement to the respondent for compliance

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[1] Harold W. See, "Send It To The President," *Phi Delta Kappan*, 38:4, January, 1957, p. 130.

with the request. Commercial agencies furnish rewards in goods or money. In educational circles a summary of questionnaire results is considered an appropriate reward, a promise that should be scrupulously honored after the study has been completed.

The cover letter should assure the respondent that delicate information will be held in strict confidence. The explanation of sponsorship might well be mentioned. Of course, a stamped, addressed return envelope should be included. To omit this courtesy would be practically to guarantee that many of the questionnaires would go into the wastebasket. It has been suggested that two copies of the questionnaire be sent, one to be returned when completed, and the other for the respondent's own file.

8. Recipients are often slow to return completed questionnaires. To increase the number of returns, a vigorous follow-up procedure may be necessary. A courteous post card reminding the recipient that the completed questionnaire has not been received will bring in some additional responses. This reminder will be effective with those who have just put off or forgotten to fill out or mail the document. A further step in the follow-up process may involve a personal letter of reminder. In extreme cases a telegram, 'phone call, or personal visit may bring additional responses.

It is difficult to estimate, in the abstract, what percentage of questionnaire responses is to be considered adequate or satisfactory. The importance of the project, the quality of the questionnaire, the care used in selecting recipients, the time of year, and many other factors may be significant in determining the proportion of responses. Needless to say, the smaller the percentage of responses, the smaller the degree of confidence one may place in the adequacy of the data collected. Of course, objectivity of reporting requires that the proportion of responses received should always be included in the research report.

In concluding this part of the discussion it would be appropriate to recognize the important part that questionnaires play in educational research. The American Association of School Administrators and the Research Division of the National Education Association publish an annual bibliography, *Questionnaire Studies Com-*

pleted.[2] This report, published annually since 1930, provides educators with an alphabetized list of topics covered and a short abstract of each study. These studies deal with all phases of education, including such topics as school finance, teaching methods, personnel, transportation, curriculum, and legal aspects.

THE OPINIONNAIRE OR ATTITUDE SCALE

The information form that attempts to obtain the measured attitude or belief of an individual is known as an opinionnaire or attitude scale. Since the terms *opinion* and *attitude* are not synonymous, a clarification is necessary.

How an individual feels, or what he believes, is his attitude. But it is difficult, if not impossible, to describe and measure attitude. The researcher must depend upon what the individual says as to his beliefs and feelings. This is the area of opinion. Through the use of questions, or by getting an individual's expressed reaction to statements, a sample of his opinion is obtained. From this statement of opinion may be inferred or estimated his attitude—what he really believes.

The process of inferring attitude from expressed opinion has many limitations. An individual may conceal his real attitude, and express socially acceptable opinions. An individual may not really know how he feels about a social issue. He may never have given the idea serious consideration. An individual may be unable to know his attitude about a situation in the abstract. Until confronted with a real situation, he may be unable to predict his reaction or behavior.

Even behavior itself is not always a true indication of attitude. When politicians kiss babies, their behavior may not be a true expression of affection towards infants. Social custom or the desire for social approval make many overt expressions of behavior mere formalities, quite unrelated to the inward feelings of the individual.

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[2] National Education Association, Research Division, and American Association of School Administrators, *Questionnaire Studies Completed.* Bibliography No. 29, 1957–58 (Washington: The Association, December 1958.)

Even though there is no sure method of describing and measuring attitude, the description and measurement of opinion, in many instances, may be closely related to the real feeling or attitude of an individual.

With these limitations in mind, psychologists and sociologists have explored an interesting area of research, basing their data upon the expressed opinions of individuals. Several methods have been employed:

1. Asking the individual directly how he feels about a subject. This technique may employ a schedule or questionnaire of the open or closed form. It may employ the interview process, in which the respondent expresses his opinions orally.

2. Asking the individual to check the statements in a list with which he is in agreement.

3. Asking the individual to indicate his degree of agreement or disagreement with a series of statements about a controversial subject.

4. Inferring his attitude from his reaction to projective devices, through which he may reveal his attitude unconsciously. (A projective device is a data-gathering instrument which conceals its purpose in such a way that the subject cannot guess how he should respond to appear in his best light. Thus, his real characteristics are revealed.)

Two of these procedures have been used extensively in opinion research, and warrant a brief description.

Thurstone technique

The first is known as the Thurstone Technique of scaled values.[3] A number of statements, usually twenty or more, that express various points of view towards a group, institution, idea, or practice are gathered. They are then submitted to a panel of fifty or more judges, who each arrange them in eleven groups, ranging from one extreme to another in position. This sorting by each judge yields a composite position for each of the items. When there has been marked disagreement between the judges in assigning a position to an item, that item is discarded. For items that are retained, each is given its median scale value, between one and eleven, as established by the panel.

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[3] L. L. Thurstone and E. J. Chave, *The Measurement of Attitudes* (Chicago: University of Chicago Press, 1929.)

The list of statements is then given to the subjects, who are asked to check the statements with which they are in agreement. The median value of the statements that they check establishes their score, or quantifies their opinion.

Lickert method

The second method, the Lickert Method of Summated Ratings, which can be carried out without the panel of judges, has yielded scores very similar to those obtained by the Thurstone method. The coefficient of correlation between the scales was reported as high as +.92 in one study.[4] Since the Lickert-type scale takes much less time to construct, it offers an interesting possibility for the student of opinion research.

The first step in constructing a Lickert-type scale consists of collecting a number of statements about a subject. The correctness of the statements is not important. If they express opinions held by a substantial number of people, they may be used. It is important that they express definite favorableness or unfavorableness to a particular point of view. The number of favorable and unfavorable statements should be approximately equal.

After the statements have been gathered, a trial test should be administered to a number of subjects. Only those items that correlate with the total test should be retained. This testing for internal consistency will help to eliminate statements that are ambiguous or that are not of the same type as the rest of the scale. A few statements from an opinionnaire appear on p. 158.

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[4] Allen L. Edwards and Katherine C. Kenney, "A Comparison of the Thurstone and Lickert Techniques of Attitude Scale Construction," *Journal of Applied Psychology*, 30:72–83, February, 1946.

INTERCULTURAL OPINIONNAIRE

The following statements are presented as generalizations and represent opinions rather than facts. As opinions, they are neither right nor wrong, and your agreement or disagreement will be determined largely in terms of your particular experiences. Kindly check your position on the statement as it first impresses you. Indicate *what you believe*, rather than what you think you should believe.

a. I agree with the statement.
b. I am inclined to agree (with reservations).
c. I cannot say (have no feeling one way or another)
(the evidence is insufficient).
d. I am inclined to disagree (disagree with reservations).
e. I disagree.

	a	b	c	d	e
1. The religious beliefs of an applicant should not be considered in selecting public-school teachers.					
2. Negro children should attend separate but equally good schools.					
3. No one should be barred from buying a home in a good residential area because of his race or religion.					
4. If Negroes were placed in good homes in good residential areas, the property would soon deteriorate and become shabby.					
5. There is no reason why a Catholic should not be elected President of the United States.					

It is apparent that this technique could be used to measure opinion in many areas of controversy: the recognition of Red China by the United Nations, racial integration in the public schools, the teaching of religion in the public schools, federal aid to education, universal military training, right-to-work legislation, and many others.

These scales may be analyzed in several ways. A simple way to describe but not measure opinion is to indicate the percentage responses on each item. Three out of four teachers agree that ——; 80 per cent of male teachers agree with the statement ——

The actual Lickert scaling technique assigns each position a scale value. Starting with a point of view, all statements favoring this position would be scored:

	Scale Value
a. Agree	5
b. Tend to Agree	4
c. Cannot Say	3
d. Tend to Disagree	2
e. Disagree	1

For statements opposing this position, the items would be scored in the opposite order

	Scale Value
a. Agree	1
b. Tend to Agree	2
c. Cannot Say	3
d. Tend to Disagree	4
e. Disagree	5

The test scores obtained on all of the items would then measure the respondent's favorableness towards the given point of view.

If the opinionnaire consisted of thirty statements or items, the following score values would be revealing:

$30 \times 5 = 150$ Most favorable response possible
$30 \times 3 = 90$ A neutral atttiude
$30 \times 1 = 30$ Most unfavorable attitude

The scores for any individual would fall between 30 and 150; above 90, if opinions tended to be favorable, and below 90, if opinions tended to be unfavorable to the given point of view.

The author has used this device in a course which includes a unit dealing with intercultural relations. It is interesting to note whether information about minority groups tends to alter an individual's attitude or opinion towards the group. Before the unit is begun, the students respond to a thirty-statement opinionnaire devised by the author. The papers are filled out anonymously, and each student is instructed to mark his paper with some symbol known only to him, so that he can identify it at a later date.

Upon the completion of the unit several weeks later, the students respond to another copy of the same opinionnaire, again marking it with the symbol previously used. After the papers are scored, the instructor has a device which indicates possible changes in attitude or, at least, in expressed opinions. Invariably, there has been consistent growth in favorableness towards minority groups. While the measure is crude, it does seem to support the hypothesis that knowledge about minority groups brings about a more favorable attitude towards them—in the classroom, at least. It is possible that the change in score is more significant than the magnitude of the score itself, for the validity of the instrument has not been, and cannot be, established.

This example of opinion analysis demonstrates how a teacher may use this technique to create class interest, even though it may fail to achieve the rigorous standards of fundamental research procedures.

It would be unwise to conclude this discussion without a recognition of the limitations of this type of opinion measurement. Obviously, it is somewhat inexact, and fails to measure opinion with the precision that one would desire.

There is no basis for belief that the five positions indicated on the scale are equally spaced. The interval between "tend to agree" and "agree" may not be equal to the interval between "tend to agree" and "cannot say." It is also unlikely that the statements are of equal value in "for-ness" or "against-ness." That the respondent can validly react to a short statement on a printed form, in the absence of real-life qualifying situations, is unlikely. That equal scores obtained by several individuals indicate equal favorableness towards the given position is unlikely. Actually, different combinations of positions can yield equal score values, without necessarily indicating equivalent positions of attitude or opinion. Even though the opinionnaire provides for anonymous response, there is a possibility that an individual may answer according to what he thinks that he *should* feel, rather than how he *really* feels.

In spite of these limitations, the process of opinion measurement has merit, and until more precise measures of attitude are developed, this technique may serve a useful purpose in social research.

OBSERVATION

As a data-gathering device, direct observation may make an important contribution to descriptive research. Certain types of information can best be obtained through direct examination by the researcher. When the information concerns aspects of material objects or specimens, the process is relatively simple, and may consist of classifying, measuring, or counting. But when the process involves the study of a human subject in action, it is much more complex.

One may study the characteristics of a school building by observing and recording such aspects as materials of construction, number of rooms for various purposes, size of rooms, amount of furniture and equipment, presence or absence of certain facilities, and other relevant aspects. Adequacy could then be determined by comparing these facilities with reasonable standards, previously determined by expert judgment and research.

In university athletic departments observation has been used effectively to scout the performance of the teams that will be encountered in interschool competition. Careful observation and recording of the skills and procedures of both team and individual players are made, and defenses and offenses are planned to cope with them. What formations or patterns of attack or defense are employed? Who carried the ball? Who does the passing, and where and with what hand does he pass? Who are the likely receivers, and how do they pivot and cut?

During a game a coaching assistant may sit high in the stands, relaying strategic observations by phone to the coach on the bench. At the same time, every minute of play is being recorded on film for careful study by the coaching staff and players. Who missed his tackle when that play went through for twenty yards? Who missed his block when play number two lost six yards? Careful study of these films provides valuable data on weaknesses to be corrected before the following Saturday's game. Through the use of binoculars, the phone, the motion picture camera, and the tape recorder, observations can be carefully made and recorded.

While this example may seem inappropriate in a discussion of observation as a research technique, improving the performance of a football team is not altogether different from the problem of analyzing learning behavior in a classroom. The difference is one of degree of complexity. The objectives of the football team are more concretely identifiable than the more complex purposes of the classroom. Yet, some of the procedures of observation, so effective in football coaching, may also be systematically employed in studying classroom performance. In some schools teachers make short periodic classroom or playground observations of pupil behavior, which are filed in the cumulative folder. These recorded observations, known as anecdotal reports, may provide useful data for research studies.

The method of laboratory experimentation seeks to describe action or behavior that will take place under carefully arranged and controlled conditions. But many important aspects of human behavior cannot be profitably observed under the contrived conditions of the laboratory. The method of descriptive research seeks to describe behavior under less rigid controls, under more naturally occurring conditions. The behavior of children in a classroom situation cannot be effectively analyzed by observing their behavior in a laboratory. It is necessary to observe what they actually do in a real classroom.

This does not suggest that observation is haphazard or unplanned. On the contrary, observation as a research technique must always be expert, directed by a specific purpose, systematic, carefully focused, and thoroughly recorded. Like other research procedures, it must be subject to the usual checks for accuracy, validity, and reliability.

The observer must know just what to look for. He must be able to distinguish between the significant aspects of the situation and factors that have little or no importance to the investigation. Of course, objectivity is essential, and careful and accurate methods of measuring and recording are employed. The use of the check list, score card, or some other type of inquiry form may help to objectify and systematize the process.

The use of accurate instruments such as the scale, thermometer, stethoscope, audiometer, stop watch, light meter, binoculars, camera, tape recorder, and other devices often makes possible observations that are more refined than mere sense observations. At times, the nature of an act may be more accurately analyzed when the action is slowed down, repeated, or re-examined. The use of the motion picture camera, time-lapse photography, or the tape recorder has facilitated the analysis of complex activities.

Both reliability and validity of observation are improved when observations are made at frequent intervals by the same observer, or when several observers record their observations independently. It is often important to establish conditions so that activities may take place in as natural a setting as possible, and are not unduly influenced by the presence of the observer or by his measuring or recording devices.

Newspaper reporters have confessed to minor crimes, in order to get a true picture of existing prison conditions. Secret agents assume elaborate disguises and establish fictitious identities, in order to find out what really happens inside a conspiracy. Hidden cameras and a one-way screen were used by Gessell to make significant observations of the behavior of infants. One-way windows have been used to observe the behavior of children in typical group activities, so that observers could see and hear without being either seen or heard.

Recording observations

If it does not distract or create a barrier between observer and those observed, simultaneous recording of observations is recommended. This practice minimizes the errors that result from faulty memory. There are other occasions when recording would more appropriately follow some time after observation. The recording of observations should be done as soon as possible, while the details are still fresh in the mind of the observer. But many authorities agree that objectivity is more likely when the interpretation of the meaning of the behavior described is deferred until a later time, for simultaneous recording and interpretation often interfere with objectivity.

Systematizing data collection

To aid in the recording of information gained through observation, a number of devices have been extensively used. Check lists, rating scales, score cards, and scaled specimens provide systematic means of summarizing or quantifying data collected by observation or examination.

Check list

The check list, the simplest of the devices, consists of a prepared list of items. The presence or absence of the item may be indicated by checking yes or no, or the type or number of items may be indicated by inserting the appropriate word or number. This simple "laundry-list" type of device systematizes and facilitates the recording of observations, and helps to assure the consideration of the important aspects of the object or act observed. Readers are familiar with check lists prepared to help buyers purchase a used car, choose a home site, or buy an insurance policy, indicating characteristics or features that one should bear in mind before making a decision.

Rating scale

The rating scale involves qualitative description of a limited number of aspects of a thing, or of traits of a person. The classifications may be set up in five to seven categories in such terms as:

Superior	Above Average	Average	Fair	Inferior
Excellent	Good	Average	Below Average	Poor
Always	Frequently	Occasionally	Rarely	Never

Another procedure establishes positions in terms of behavioral or situational descriptions. These statements may be much more specific, and enable the judge to identify more clearly the characteristic to be rated. Instead of deciding whether the individual's leadership qualities are superior or above average, it may be easier to decide between "Always exerts a strong influence on his associates," and "Sometimes is able to move others to action."

One of the problems in constructing a rating scale lies in the difficulty of conveying to the rater just what quality one wishes evaluated. It is likely that a brief behavioral statement is more objective than an adjective that may have no universal meaning in the abstract.

Rating scales have several limitations. In addition to the difficulty of clearly defining the trait or characteristic to be evaluated, the halo effect causes raters to carry qualitative judgment from one aspect to another. Thus, there is a tendency to rate a person who has a pleasing personality high on other traits like intelligence or professional interest. This halo effect is likely to appear when the rater is asked to rate many factors, on a number of which he has no evidence for judgment. This suggests the advisability of keeping at a minimum the number of characteristics to be rated.

Another limitation of rating is the tendency of raters to be too generous. A number of studies have verified the tendency to rate 60 to 80 per cent of an unselected group above average in all traits. Rating scales should carry the suggestion that raters omit the rating of characteristics that they have had no opportunity to observe.

Score card

The score card, similar in some respects to both the check list and the rating scale, usually provides for the appraisal of a relatively large number of aspects. In addition, the presence of each characteristic or aspect, or the rating assigned to each, has a predetermined point value. Thus, the score-card rating may yield a total weighted score that can be used in the evaluation of the object observed. Score cards are frequently used in evaluating communities, building sites, schools, or textbooks. Accrediting agencies sometimes use the score card in arriving at an over-all evaluation of a school.

Score cards have been designed to help in estimating the socio-economic status of a family. Such aspects as type of neighborhood, home (owned or rented), number of rooms, ownership of a piano, number of books in the library, number and type of periodicals subscribed to, telephone, occupation of father, and organizations parents belong to are all considered significant and have appropriate point values assigned.

The limitations of the score card are similar to those of the rating scale. In addition to the difficulty of choosing, identifying, and quantifying the significant aspects of the factor to be observed, there is the suspicion that the whole of a thing may be greater than the sum of its parts.

Colleges and universities are frequently evaluated in terms of such elements as size of endowment, proportion of faculty members holding the earned doctoral degree, pupil-teacher ratio, and number of volumes in the library. While these aspects are important, the effectiveness of an institution may not be accurately appraised by their summation, for there are certain important intangibles that do not lend themselves to score card ratings.

Scaled specimen

The scaled specimen, although not frequently encountered, provides an effective method for evaluating certain standards of performance. Thorndyke's handwriting scales provide a number of graded samples to which one may compare the handwriting to be evaluated. Various intelligence test scoring manuals provide scaled specimens for determining the mental age of children as revealed by their drawings.

Content or document analysis

The systematic examination of records or documents is a specialized application of data-gathering by observation. Since this process has been discussed in some detail in the chapter on descriptive research (Chap. 5), it is not repeated here.

Observation, as a research data-gathering process, demands rigorous adherence to the spirit of scientific inquiry. The following standards should characterize the observer and his observations:

1. Observation is carefully planned, systematic, and perceptive. The observer knows what he is looking for, and what is irrelevant in a situation. He is not distracted by the dramatic or the spectacular.

2. The observer is aware of the wholeness of what is observed. While he is alert to significant details, he knows that the whole is often greater than the sum of its parts.

3. The observer is objective. He recognizes his likely biases, and he strives to eliminate their influence upon what he sees and reports.

4. The observer separates the facts from the interpretation of the facts. He observes the facts, and makes his interpretation at a later time.

5. Observations are checked and verified, whenever possible, by repetition, or by comparison with those of other competent observers.

6. Observations are carefully and expertly recorded. The observer uses appropriate instruments to systematize, quantify, and preserve the results of his observations.

THE INTERVIEW[5]

The interview is, in a sense, an oral type of questionnaire. Instead of writing the response, the subject or interviewee gives the needed information verbally in a face-to-face relationship.

With a skillful interviewer, the interview is often superior to other data-gathering devices. One reason is that people are usually more willing to talk than to write. After the interviewer gains rapport, or establishes a friendly, secure relationship with the subject, certain types of confidential information may be obtained that an individual might be reluctant to put in writing. The interviewer can explain the purpose of his investigation, and can explain more clearly just what information he wants. If the subject misinterprets the question, the interviewer may follow it with a clarifying question. At the same time, he may evaluate the sincerity and insight of the interviewee. It is also possible to seek the same information, in several ways, at various stages of the interview, thus providing a check of the truthfulness of the responses.

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[5] See Pauline V. Young, *Scientific Social Surveys and Research* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1949), Chapter XI.

Through the interview technique the researcher may stimulate the subject to greater insight into his own experiences, and thereby explore significant areas not anticipated in the original plan of investigation. The interview is also particularly appropriate when dealing with young children, illiterates, those with language difficulties, and those of limited intelligence.

If one were to study what junior high school students like and dislike in teachers, some sort of written schedule would probably be satisfactory. In order to conduct a similar study with first-grade pupils, the interview would be the only feasible method of getting responses.

(When a graduate student in the author's class carried on such a study, she was surprised and amused to discover that first-grade children frequently mentioned "she smells nice" as a favored characteristic of the teacher.)

The preparation for the interview is a critical step in the procedure. The interviewer must have a clear conception of just what information he needs. He must clearly outline the best sequence of questions and stimulating comments that will systematically bring out the desired responses. A written outline, schedule, or check list will provide a set plan for the interview, precluding the possibility that the interviewer will fail to get important and needed data.

The nature of the personal relationship between interviewer and subject requires an expertness and sensitivity that might well be called an art. The initial task of securing the confidence and cooperation of the subject is crucial. Talking in a friendly way about a topic of interest to the subject will often dispel hostility or suspicion and, before he realizes it, the subject is freely giving the desired information. As is true in the use of the questionnaire, the interviewer must be able to assure the subject that his responses will be held in strict confidence. When interviews are not recorded by tape or other electronic device, it will be necessary for the interviewer to take written notes, either during the interview or immediately thereafter. It is suggested that the actual wording of the responses be retained. It is advisable to make the interpretation later, separating this phase of analysis from the actual recording of responses.

Recording interviews on tape is convenient and inexpensive, and obviates the necessity of writing during the interview. Writing during an interview may be a distracting influence, both to interviewer and to subject. Interviews recorded on tape may be replayed as often as necessary for complete and objective analysis at a later time. In addition to the words, the tone of voice and emotional impact of the response is preserved by the tapes.

As a data-gathering technique, the interview has unique advantages. In areas where human motivation as revealed in reasons for actions, feeling, and attitudes is concerned, the interview can be most effective. In the hands of a skillful interviewer, through interstimulation of himself and the subject, a depth of response is possible, a penetration quite unlikely to be achieved through any other means.

This technique is time-consuming, however, and one of the most difficult to employ successfully. The danger of interviewer bias is constant. Since the objectivity, sensitivity, and insight of the interviewer is crucial, this procedure is one that requires a level of expertness not ordinarily possessed by inexperienced researchers.

PSYCHOLOGICAL TESTS

As data-gathering devices, psychological tests are among the most useful tools of educational research. Since their basic purpose is to describe and measure individual differences, they provide the necessary data from which improved principles and practices may be developed.

The short presentation of this section can examine only limited aspects of the nature of psychological testing. Students of educational research should consult other volumes for a more complete discussion.[6]

A psychological test is an instrument designed to describe and measure a sample of certain aspects of human behavior. Tests may be used to compare the behavior of two or more persons at a particular time, or one or more persons at different times. Psychological tests yield objective and standardized descriptions of behavior, quantified by numerical scores. Under ideal conditions, achievement or aptitude tests measure the best performance of which individuals are capable. Under ideal conditions, personality tests or inventories attempt to measure typical behavior. Tests are used to describe status (or a prevailing condition at a particular time), to measure changes in status produced by modifying factors, or to predict future behavior on the basis of present performance.

In the simple classroom experiment described in the chapter on experimental research (Chap. 6), test scores were used to equate the experimental and control groups, to describe status in achievement before the application of teaching methods, to measure pupil mean gain resulting from the application of experimental and control teaching methods, and to evaluate the relative effectiveness of teaching methods. This example of classroom experimentation illustrates how experimental data may be gathered through the application of tests.

In descriptive research studies tests are frequently used to describe prevailing conditions at a particular time. How does a student compare with those of his own age or grade in school achievement? How does a particular group compare with other groups in other schools, or in other cities?

In school surveys for the past forty years, achievement tests have been used extensively in the appraisal of instruction. Tests are frequently used in comparing the factors in a situation that seem to go together. When high scores in one trait are associated with high scores in another, and low scores in one are associated with low scores in another, we may look for possible cause-effect relationships between the two linked factors.

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[6] Lee J. Cronbach, *Essentials of Psychological Testing* (New York: Harper & Brothers, 1949); and Anne Anastasi, *Psychological Testing* (New York: The Macmillan Co., 1954.)

Because tests yield quantitative descriptions or measures, they make possible more precise analysis than can be achieved through subjective judgment alone.

There are many ways of classifying psychological tests. One distinction is made between performance tests and paper-and-pencil tests. Performance tests, usually administered individually, require that the subject manipulate objects or mechanical apparatus while his actions are observed and recorded by the examiner. Paper-and-pencil tests, usually administered in groups, require the subject to mark his responses on a prepared sheet.

Two other opposing types are power versus timed, or speed, tests. Power tests have no time limit, and the subject attempts progressively more difficult tasks until he is unable to continue successfully. Timed, or speed, tests usually involve the element of power, but in addition, limit the time that the subject has in which to complete certain tasks.

Another distinction is that made between nonstandardized, teacher-made tests and standardized tests. The test that the classroom teacher constructs is likely to be less expertly designed than that of the professional, although it is based upon the best logic and skill that the teacher can command, and is usually "tailor-made" for a particular group of pupils.

By contrast, the standardized test is designed for more general use. Each item has been subjected to careful analysis, total scores have been carefully analyzed, and validity and reliability established by careful statistical controls. Norms have been established, based upon the performance of many subjects of various ages living in many different types of communities and geographic areas. Not only has the content of the test been standardized, but the administration and scoring have also been set in one pattern so that those subsequently taking the tests will take them under like conditions. As far as possible, the interpretation has also been standardized.

While it would be inaccurate to claim that all standardized tests meet optimum standards of excellence, these instruments have been made as sound as possible in the light of the best that is known by experts in test construction, administration, and interpretation.

Psychological tests may also be classified in terms of their purposes—the types of psychological traits that they describe and measure.

Achievement tests

Tests of ability, or achievement tests, attempt to measure what an individual has learned—his present level of performance. Most tests used in schools are achievement tests. They are particularly helpful in determining individual or group status in academic learning. Achievement test scores are used in placing, advancing, or retaining students at particular grade levels. They are used in diagnosing strengths and weaknesses, and as a basis for awarding prizes, scholarships, or degrees.

Frequently, achievement test scores are used in evaluating the influences of courses of study, teachers, teaching methods, and other factors considered to be significant in educational practice. In using tests for evaluative purposes it is important not to generalize beyond the specific elements measured. For example, to identify effective teaching exclusively with the limited products measured by the ordinary achievement test would be to define effective teaching too narrowly. It is essential that researchers recognize that the elements of a situation under appraisal need to be evaluated on the basis of a number of criteria, not solely on a few limited aspects.

Aptitude tests

Aptitude tests attempt to predict the capacities or the degree of achievement that may be expected from individuals in a particular activity. To the extent that they measure past learning, they are similar to achievement tests. To the extent that they measure nondeliberate or unplanned learnings, they are different. Aptitude tests attempt to predict an individual's capacity to acquire improved performance with additional training.

Actually, capacity (or aptitude) cannot be measured directly. Aptitude can only be inferred on the basis of present performance, particularly in areas where there has been no deliberate attempt to teach the behaviors to be predicted.

Intelligence, which is generally thought of as inborn potentiality, is really measured by present ability. Whether an individual's achievement is relatively high, average, or low, we assume that it is a measure of how effectively he has profited from his informal opportunities for learning. To the extent that others have had similar opportunities, we predict his capacity or potentiality on the basis of how his ability compares with that of others his own age. This is a matter of inference rather than direct measurement. Since it has proved useful in predicting future achievement, particularly in academic pursuits, we consider this concept of intelligence measurement a valid application.

Aptitude tests have been similarly designed to predict improved performance with further training in many areas. These inferred measurements have been applied to mechanical and manipulative skills, musical and artistic pursuits, and in many professional areas involving many types of predicted ability.

In music, for example, ability to remember and discriminate between differences in pitch, rhythm pattern, intensity, and timbre seems to be closely related to future levels of development in musicianship. Present proficiency in these tasks provides a fair predictive index of an individual's ability to profit from advanced instruction, particularly when the individual has had little formal training in music prior to the test.

Aptitude tests may be used to divide students into relatively homogeneous groups for instructional purposes, to identify students for scholarship grants, to screen individuals for particular educational programs, or to help guide individuals into areas where they are most likely to succeed.

Interest

Interest tests or inventories attempt to yield a measure of the types of activities that an individual has a tendency to like and to choose. One kind of test has compared the subject's pattern of interest to the interest patterns of successful practitioners in a number of vocational fields. A distinctive pattern has been discovered to be characteristic of each field. The assumption is made that an individual is happiest and most successful working in a field most like his own measured pattern of interests.

Another test is based on the correlation between a number of activities from the areas of school, recreation, and work. These related activities have been identified by careful analysis with mechanical, computational, scientific, persuasive, artistic, literary, musical, social-service, and clerical areas of interest. By sorting the subject's stated likes and dislikes into various interest areas, a percentile score for each area is obtained. It is then assumed that the subject will find his area of greatest interest where his percentile scores are relatively high.

Interest blanks or inventories are examples of self-report instruments in which the individual notes his own likes and dislikes. These self-report instruments are really standardized interviews in which the subject, through introspection, indicates feelings that may be interpreted in terms of what is known about interest patterns.

Personality measures

The so-called personality scales follow much the same self-report pattern. The individual checks responses to certain questions or statements. These instruments yield scores which are assumed to measure certain personality traits or tendencies. To the extent that they have been carefully standardized and yield quantitative scores, they may be considered tests. But they have many of the characteristics of questionnaires or self-rating scales.

Because of the difficulty, inability, or unwillingness of individuals to report their own reactions accurately or objectively, these instruments are of limited value. Part of this limitation may be due to the inadequate theories of personality upon which these tests have been based. At best, they provide useful data upon which to suggest the need for further analysis. Some have reasonable empirical validity with particular groups of individuals, but prove to be inadequate when applied to others. For example, one personality inventory has proven valuable in yielding scores that correlate highly with the diagnosis of psychiatrists in clinical situations. But when applied to college students, its diagnostic value has proved disappointing.[7]

The development of instruments of personality description and measurement is relatively recent, and it is likely that continued research in this important area will yield better theories of personality and better instruments for describing and measuring its various aspects.

The Mooney Problems Check List [8] is an inventory to be used by a student in reporting his own problems of adjustment. The subject is asked to indicate on the check list the problems that trouble him. From a list of these items, classified into different categories, a picture of the student's problems, from his own viewpoint, is drawn. While the most useful interpretation may result from an item analysis of personal problems, the device does yield a quantitative score which may indicate the degree of difficulty that a student feels that he is experiencing in his adjustment. This instrument has been used as a research device to identify and describe the nature of the problems facing individuals and groups of individuals in a school.

The tendency to withhold embarrassing responses and to express those that are socially acceptable; the emotional involvement of an individual with his own problems; and lack of insight—all these limit the effectiveness of personal and social-adjustment scales. Some psychologists believe that the projective type of test offers greater promise, for these attempt to disguise their purpose so completely that the subject is unable to know how to appear in the best light.

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[7] Cronbach, *op. cit.*, p. 320.

[8] Ross L. Mooney, *Problem Check List, High School Form* (Columbus, Ohio. Bureau of Educational Research, Ohio State University, 1941.)

The most commonly used projective tests involve the subject's interpretation of the meaning of various standardized ink-blot figures or pictured situations.

QUALITIES OF A GOOD TEST

In selecting tests for research purposes, several qualities are desirable.

Validity

In general, a test is valid if it measures what it claims to measure. However, validity may be defined in a number of ways. Logical validity means that the test actually measures or is specifically related to the trait(s) for which it was designed. But the test name is no measure of logical validity. Some tests of skill in English usage consist of identifying errors of punctuation, spelling, agreement, and capitalization on a multiple-choice basis. While items of this type are relatively easy to construct, they tend to overemphasize certain phases of good usage, and have a very limited relationship to real skill in usage or the purposes of a good course in composition.

Empirical validity is concerned with the usefulness of a test in predicting successful performance, or how well it accomplishes a practical purpose. If a test is designed to pick out good candidates for appointment as shop foremen, and test scores show a high positive correlation with actual success on the job, the test has a high degree of empirical validity, whatever factors it actually measures. It predicts well. It serves a useful purpose.

But before a test can be evaluated on the basis of empirical validity, success on the job must be accurately described and measured. The criteria of the production of the department, the judgment of supervisors, or measures of employee morale might serve as evidence. Since these criteria might not be entirely satisfactory, however, empirical validity is not easy to assess. It is often difficult to discover whether the faults of prediction lie in the test, in the criteria of success, or in both. Many so-called intelligence tests have a high degree of empirical validity. While there is great difference of opinion about the nature of intelligence, these tests have proved quite effective in predicting academic success. Perhaps they would be more appropriately labeled academic-aptitude tests. They do predict well. They serve a useful purpose.

Tests are often validated by comparing their results with a test of known validity. A well-known scale of personal adjustment involved sorting nearly five-hundred cards into three categories, *yes*, *no*, and *cannot say*. The test equipment was expensive, and it could not be easily administered to large groups at the same time. A paper-and-pencil form was devised, using the simple process of checking responses to printed items on a test form. This form could be administered to a large group at one time and then scored by machine, all with little expense. The results were so similar to the more time-consuming, expensive card-sorting process, that the latter has been largely replaced. This is an example of validation by comparing tests; in this case, by comparing an expensive, individual test with an easy-to-administer, group test.

In like manner, performance tests have been validated against paper-and-pencil tests, and short tests against longer tests. Through this process, more convenient and more appropriate tests can be devised to accomplish the measurement of behavior more effectively.

There are other aspects of validity, perhaps beyond the scope of this discussion. The reader is urged to consult the volumes on psychological testing cited at the beginning of this section.

Reliability

This quality suggests that a test measures accurately and consistently, from one time to another. In tests that have a high coefficient of reliability, errors of measurement have been reduced to a minimum. Reliable tests, whatever they measure, yield comparable scores upon repeated administration. An unreliable test